EXCAVATING ENGINEER

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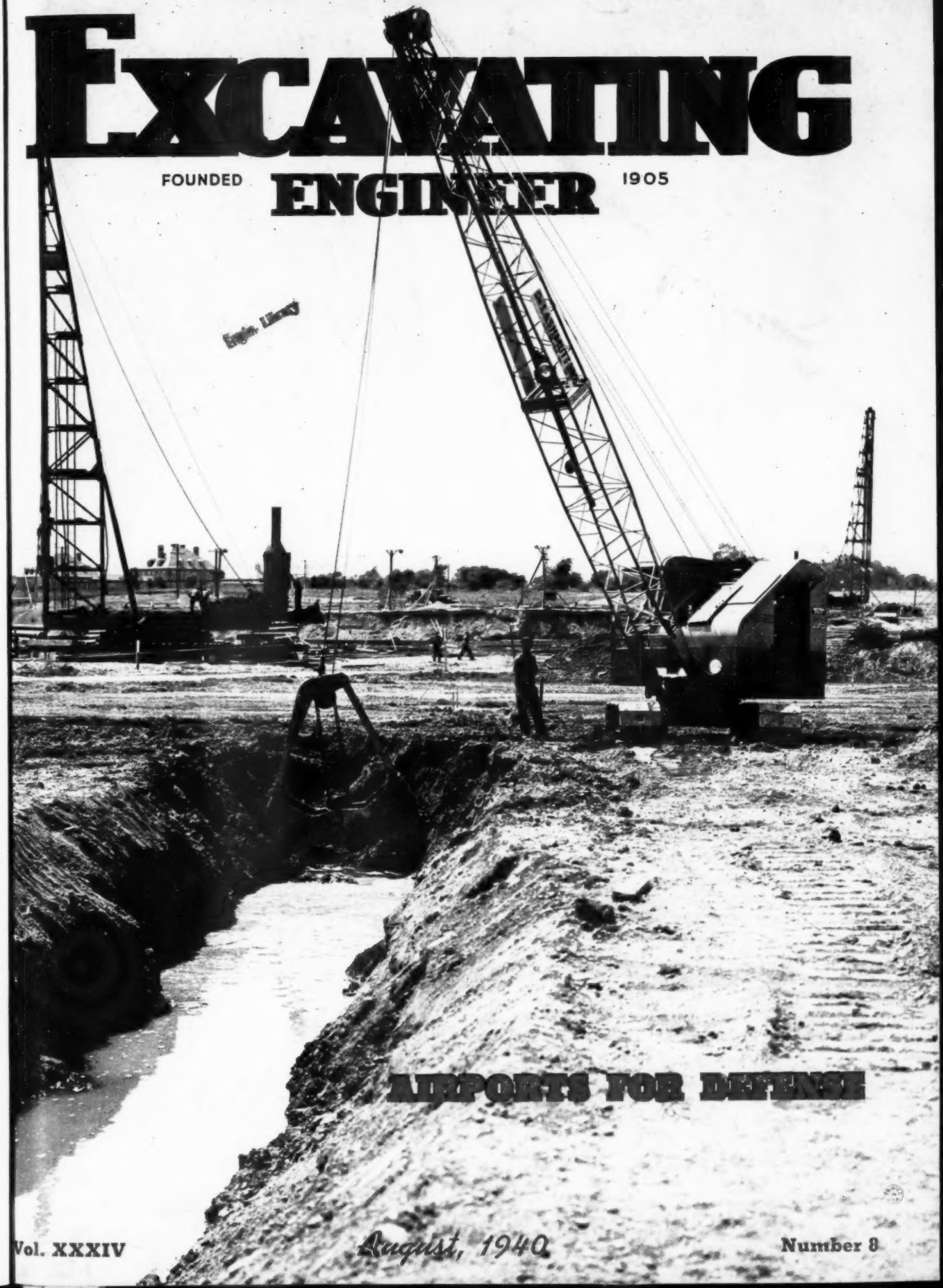
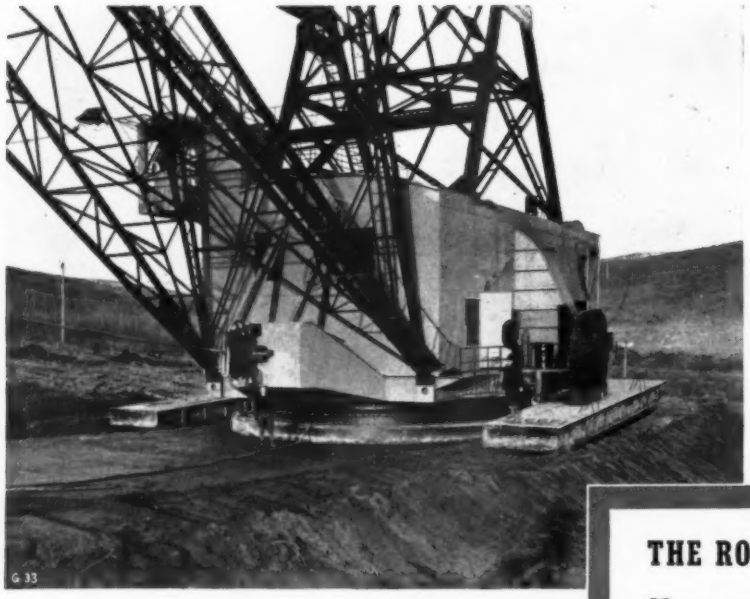


AIRPORTS FOR DEFENSE

Vol. XXXIV August, 1940 Number 8



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Watch a new Bucyrus-Monighan "cushion down" as it walks. You'll be impressed by the smooth, positive action, capable of walking a 2,000,000-pound machine without destructive jerks, hops or bumps.

Watch a veteran Bucyrus-Monighan walk — one that has handled as much as a million yards. You'll find the same firm-footed smoothness. Hundreds of these walkers, operating all over the world, over all kinds of ground, have proved the lasting efficiency of Bucyrus-Monighan's exclusive walking action.

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4. Low total lift of base permits efficient walking on grades.
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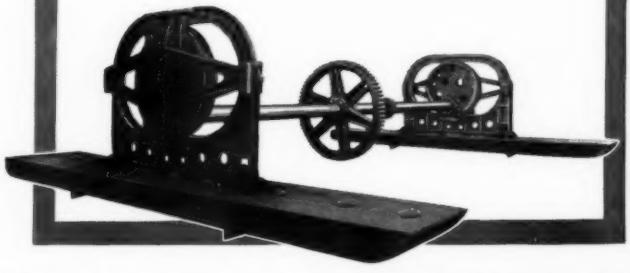

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

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FOUNDED 1905

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For your convenience in writing to Socony-Vacuum Oil Co., Inc., you will find a card bound in this issue.

Latest News on the Washington National Airport—

24 International TD-18's are Speeding it to Completion!

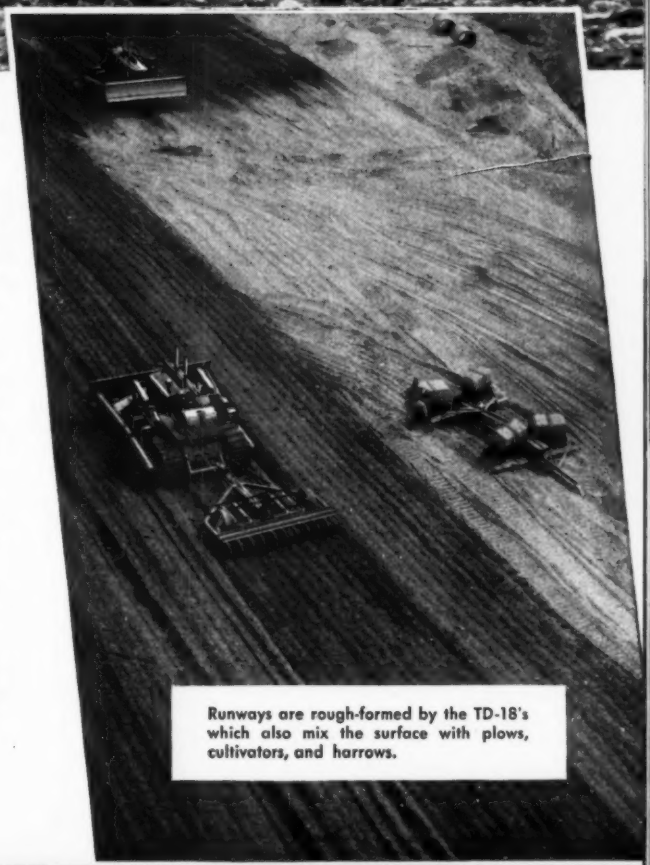
Above: The International TD-18 Diesels turn, mix, and dry the fill material. They also distribute and re-distribute it around the airport and into the runway bases. An unusual rock formation from the river bed makes it tough on tracks, but the TD-18's are standing the punishment in good shape.

AMERICA'S largest airport and terminal, at Gravelly Point, Va., serving the nation's capital, is now being rushed to completion with the aid of 24 International TD-18 Diesel TracTracTors. These powerful crawlers have taken over this tremendous earth-moving job as a result of the outstanding performance of one of these units which went on the job a year ago.

When the new TD-18 hit the market early last year, the demand far exceeded the supply. As soon as the Northern Virginia Construction Co., Alexandria, managed to get one, they put it to work on the Washington Airport. Right from the start, the TD-18 became the most popular tractor on the field. Everyone wanted to use it. Unqualified statements made by those who got it, labeled the TD-18 as the *best tractor on the field regardless of size.*

With all these men *the reputation of* this great tractor *was made.* It was natural, then, for 12 more TD-18's to get the call in February. Today there's a total of 24, owned by the Northern Virginia Construction Co.; L. B. Smith, Harrisburg; and the Capital Excavating Co., Highway Engineering Co., and Morauer and Harzell, Washington. In addition, there are 2 International I-40 wheel-type tractors on the job.

The International TD-18 Diesel *had to be plenty good on the Washington Airport*—as on *every* job, because it's been under the severest scrutiny. And its three new smaller brothers are carrying on the good work. See the International industrial power dealer or Company branch near you about the four International Diesel TracTracTors.



Runways are rough-formed by the TD-18's which also mix the surface with plows, cultivators, and harrows.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

RELO

● Modern equipment is the keynote as this Bucyrus-Erie 33-B loads out borrow to a Koehring Trail-Dump on the Thornton contract.

"Short on mileage but long on problems" aptly describes Thornton Construction Company's 4.4 mile highway grade construction job at Baraga, Michigan.

INDIAN GRAVES, freezing temperatures, and the Duluth, South Shore & Atlantic railroad provided some unusual problems on the 4.4 miles of grade construction that the Thornton Construction Company of Hancock, Michigan, is completing along the shore of Lake Superior's Keweenaw Bay.

A new part of U. S. Route 41, which spans the middle west from Miami, Florida, to Copper Harbor, Michigan, the Thornton contract extends through Baraga, Michigan, and is being built under the supervision of the Michigan State Highway Department. Hugging the shore line near the tip of Keweenaw Bay, this new section of highway will replace the winding, gravel roadbed of old 41.

Contract Prices

Chief items in the Thornton Company's bid price of $149,559 for this 4.4 miles of grade construction are the handling of 306,972 yards of earth and rock, the construction of a crib at the northern end of the job, and the placement of necessary drainage structures. An additional 5,000 yards of rock was added later to the original contract.

The above price called for fast, economical dirt moving equipment and the company used the following machines on the job:

5—Bucyrus-Erie excavators (33-B, 22-B, 19-B, two 10-B's)
4—Koehring Trail-Dumps (3 TD-1 and 1 TD-7)
3—Caterpillar tractors ("60", RD-7, and RD-8)
1—LeTourneau 12-yard scraper
2—LeTourneau bulldozers
1—Adams patrol
1—Gardner-Denver compressor
1—Gardner-Dénver wagon drill
1—Ingersoll-Rand jackhammer
1—Ford V-8 service truck

A varying number of 3-yard trucks were rented to fill the need for extra hauling equipment.

Equipment was moved in on the contract last February and land clearing operations were started on the right-of-way and three borrow areas. About 18 acres of land were cleared by crews of 15 to 20 men working two 7-hour shifts. Grubbing operations were also carried out on 2,479 square rods of the contract. Stumps left by the clearing crews were rooted out by one of the Caterpillar-mounted LeTourneau 'dozers and deck piled for burning by a Bucyrus-Erie 10-B equipped as a shovel. Green brush and wet stumps were kept burning by the use of old rubber tires which were thrown into the fires to serve as added fuel.

An unusual feature of these preparatory operations was the removal of 171 Indian graves to a

● White crosses mark the new resting place of the graves removed from 41's right-of-way by members of the Assinins Indian Mission.

ATING ROUTE 41

● Hauling roads in the borrow area receive the attentions of an Adams grader towed by a Caterpillar "60".

new resting place. This was necessary because the right-of-way established by the state ran through the 100-year old cemetery of the Assinins Indian Mission. Shifting of the graves was done by Mission members under the direction of their padre, Reverend Anthony Waechter. A few old houses on the new route were wrecked and moved by state employees.

The first big problem on the contract was the construction of a 2100-foot crib on the northern end of the job. Here Highway 41's new location runs along the very edge of Keweenaw Bay to allow room for the tracks of the Duluth, South Shore & Atlantic railroad. The crib was built to eliminate a curve in the shoreline of the bay and provide a foundation for the new highway.

Construction of the crib was started early in March; freezing temperatures, snow and ice making the job anything but a pleasant one. Fill was placed by dragline and 'dozer along the shore line until the Bucyrus-Erie 33-B dragline could be spotted so that it could cast its bucket to dig a 3-foot foundation trench for the crib. This digging was done through the ice in 5 to 6 feet of water. During some periods of the operation, the men found it necessary to blast holes in the ice so the dragline could operate.

Putting Old Man Winter to Work

However, upon completion of the crib trench, the Thornton Construction Company turned the tables on old man winter and put

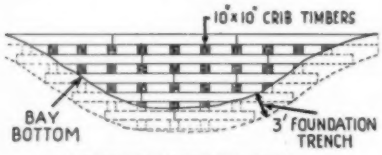
BID QUANTITIES

Clearing	18.0 acres
Grubbing	2,479 sq. rods
Removing trees 8" to 12" dia.	5 each
Removing trees 13" to 24" dia.	4 each
Removing trees 25" to 36" dia.	1 each
Cleaning up roadsides	88.6 stations
Trimming and furnishing earth grade	232.15 stations
Timber piles furnished	1,640 lin. ft.
Timber piles driven	1,640 lin. ft.
Treated timber furnished (10" square)	395,517 bd. ft.
Treated timber place	395,517 bd. ft.
Timber furnished	2,472 bd. ft.
Timber placed	2,472 bd. ft.
Misc. hardware	37,523 lbs.
Grade A concrete	220.4 yds.
Steel reinforcing	14,206 lbs.
12" Class A culverts	330 lin. ft.
15" Class A culverts	180 lin. ft.
18" Class A culverts	24 lin. ft.
18" Class B culverts	48 lin. ft.
24" Class B culverts	700 lin. ft.
30" Class B culverts	124 lin. ft.
36" Class B culverts	282 lin. ft.
15" reinforced concrete pipe	18 lin. ft.
24" reinforced concrete pipe	48 lin. ft.
24" corrugated metal	20 lin. ft.
10" sewer	52 lin. ft.
6" tile underdrain	1000 lin. ft.
Inlet 3D	1 each
Dry Rubble masonry	200 cu. yds.
Stamp sand surface (loose measure)	210 cu. yds.
Top soil surface (loose measure)	7,094 cu. yds.
6' plain cobble gutter (Detail No. 9)	120 lin. ft.
Plain riprap	140 sq. yds.
Heavy riprap	2,250 sq. yds.
Concrete right-of-way markers	52 each
Class B seeding	.3 acre
Earth excavation	293,047 cu. yds.
Rock excavation	8,925 cu. yds.
Overhaul	1,390,158 cu. yds. sta.
Overhaul	255,993 cu. yds. miles

● Top: Crib timbers are placed by a Bucyrus-Erie 10-B, equipped with a specially constructed 43-foot boom. Bottom: Snow and ice made the job of constructing this 2100-foot crib anything but a pleasant one.

● Left: Rigged with a special boom, the Bucyrus-Erie 10-B swings a concrete bucket during the construction of the box culvert. Below: The bucket's load is poured into wooden forms.

this frosty gentleman to work. As soon as the ice above the trench refroze, the framework of the crib was assembled on the same spot. About 395,500 board feet of 10″x10″ creosote-treated timbers were used in the 6-foot wide crib frame. The following profile sketch illustrates the structure of the crib:



PROFILE VIEW OF CRIB

Constructed in stair formation to conform to the shape of the bay bottom, the finished crib framework was sunk into place by the simple process of sawing the ice upon which it rested. With the crib in place, rock was immediately placed in the fill area. Although the original contract allowed for 7,829 yards of rock fill back of the crib, it was found necessary to use another 5,000 yards of material.

To break up wave action on the crib, three jetties of 24 ten-foot piles each were put in at the north end of the crib with the Bucyrus-Erie 22-B swinging a 2500-pound drop hammer on piles spaced about a foot apart.

● Left, above: A. L. Mathy, Thornton Construction Company vice-president, actively supervised the Baraga job. Left: Complete on-the-job lubrication was provided by this Ford V-8 service truck.

A stone's throw away from the site of the crib, Thornton Construction Company tackled problem No. 2 on their contract. To accommodate the 3,000-foot track location of the already mentioned Duluth, South Shore & Atlantic railroad the only sizeable cut on the entire contract was made.

Drilling for this 16.6 foot cut through sandstone was handled by the Gardner-Denver compressor and wagon drill, with secondary drilling performed by the Ingersoll-Rand jackhammer. It is interesting to note that the wagon drill put down 54 eleven-foot holes in one 11-hour shift. This time includes moves, set-ups, and bit changes. Timken detachable bits were used on both drills. Atlas powder was used on all blasting operations.

Although this cut was originally planned for a 12-foot width, the additional rock needed for the crib fill necessitated three additional 6-foot width extensions to increase the 7,829 yards of rock originally planned necessary to a total of 12,829 yards. Rock loading operations were handled by the Bucyrus-Erie 22-B shovel and 10-B crane, the latter handling oversize rock with slings for the crib fill. The Caterpillar-LeTourneau unit previously mentioned assisted in these operations.

Putting In the Drainage Structures

On most highway grade jobs that are predominately fill, drainage is an important problem and the Baraga job was no exception. A variation of drainage structures, ranging from 6-inch underdrain tile to the construction of a 5x5-foot box culvert, were included in the contract.

The two Bucyrus-Erie 10-B's, one equipped as a crane and the other as a shovel, handled the drainage structure placements with a minimum of lost time, the maneuverability of these light machines enabling the culvert crews to make the many moves necessitated by the number of drainage structures in jig time.

Concrete for the box culvert mentioned above was poured into wooden forms by the 10-B crane

equipped with a special boom attachment and concrete bucket.

Precast concrete pipe culverts ranging in diameter from 12 to 36 inches were swung into place by a cable looped over the 10-B shovel's dipper teeth. This shovel also excavated the necessary trenches for the pipe and later assisted the culvert crew in back-filling around the laid pipe. A total of 1,754 lineal feet of culvert was laid in this fashion.

Major activity in the grade construction operations on the contract was the placing of fill. With the exception of the cut already described, 41's new roadbed was mostly fill varying from grade level to 18 feet, with an average depth of 4.6 feet. Fill material was obtained from three borrow areas, one at each end of the contract and one near the center.

Baraga at one time was quite a saw mill town and as the new road site ran through the old mill yard it was necessary to excavate muck, slabs and sawdust for over a mile with the Bucyrus-Erie 33-B dragline.

High Speed Loading and Hauling

Economical placing of fill on 4.4 miles of highway from borrow pits calls for high speed loading and hauling equipment, and the Thornton Construction Company was well equipped to handle the task.

The Bucyrus-Erie 33-B dragline, swinging a 1¾ yard Red Arch bucket kept the hauling units rolling out of the borrow pit. This dragline was used in all three borrow pits as the job progressed. The four Koehring Trail-Dumps, three of 10-yard capacity and one 7-yard, headed the hauling equipment lineup. On the longer hauls as many as thirty 3-yard trucks of various makes were rented to keep the 33-B busy.

During our visit, fill operations were being carried on continuously, men and equipment working three 7-hour shifts with an hour between shifts for the lubrication and servicing of equipment. The 33-B working in the center borrow area was averaging 160 yards an hour loading out dirt to the Koehring units and rented trucks which were making a 1½ mile haul to the fill.

● Right: A Caterpillar-mounted LeTourneau 'dozer levels fill at the end of the grade. Below: These unique flood lights are made of ordinary dishpans with a bulb mounted in their center.

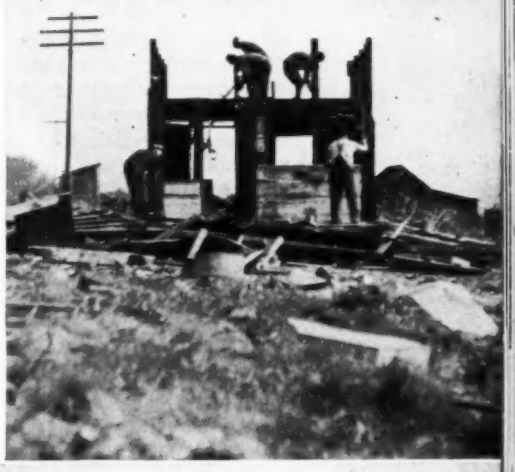
At the invitation of Loading Foreman Murel Liberty, we climbed aboard one of the Koehring "buggies" for the 1½ mile ride to the fill. It was the fastest ride we'd ever had in the company of 10 yards of dirt over a temporary hauling road and rough grade. The greater part of the haul was along the grade and the Koehring operator "opened her up." Arriving at the fill, a circular haul enabled the operator to get rid of his load without stopping. However, the writer wasn't so easily disposed of and it was necessary for the Trail-Dump actually to stand still for a second while we grabbed our camera and jumped off.

Placing the Fill

Fill for the grade was being placed with a 38-foot top surface width sloping off on 1 on 4 slopes. The surface width of 38 feet allows for 8-foot shoulders on each side of a 22-foot, 2 lane concrete strip, except on guard rail sections where the shoulder is 10 feet wide.

To facilitate dumping operations, the Koehring Trail-Dumps

(Continued on page 486)



● Right, above: Houses on the right-of-way are demolished by state employees. Right: This Bucyrus-Erie ⅜-yard shovel performed handyman service as it handled the laying of all drainage pipe on the contract.

Digging "A La Mode"

● Contractor Howard's Bucyrus-Eric 10-B removes a palm tree while making an excavation for a filling station.

Irving P. Howard, San Diego, California, contractor, irons out big-time problems on many small projects

By FLOYD SUTER BIXBY

EXCAVATION, like most other industries, has progressed with rapid strides in the past twenty years. It has shed its swaddling clothes and stepped up to a point where the yearly expended sum representing this phase of construction reaches astronomical figures. In line with its growth, the minds of men associated with the industry have likewise grown until they no longer connect the activities of a single small machine with the excavating industry as a whole.

In other words, if it isn't a 16-yard walking dragline, a 25-yard scraper or a dredge with a pipeline as large as Mammoth Cave, the job just isn't publicized. But throughout the country on varied and countless jobs the "little guy"—the fellow who is building himself up from scratch to a place in the sun among the many larger contractors—is still doing an important job of digging.

Meet Contractor Howard

Typical among these small contractors who go ahead day after day with their work, ironing out their own little problems, which

● Loading up the Caterpillar-mounted 'dozer on a trailer for transportation to the next job.

● The Northwest 105 loads out aggregate to a 5-yard truck. Overburden is piled in the foreground.

to them loom every bit as large as the posers which stump the million dollar concerns, building their jobs as nearly "on the money" as possible, is Irving P. Howard of San Diego, California. Mr. Howard operates an aggregate manufacturing plant and does excavating jobs on the side for precisely the same reason the president of a mammoth concern signs on the contract line for a much larger job. Like the president of the big company, he is out to make a living for himself and to provide one for the men who work under him.

Contractor Howard has been in the small construction game since 1931, when he set up a gravel plant in a creek wash near East San Diego, at 54th Street and Chollas Road. During the past year he has branched out into larger contracting and has taken many structural excavation jobs near San Diego.

Excavation in this part of the country is something that presents a variety of problems to whomever attempts it. The geology of the adjacent territory is peculiar. San Diego is on the Pacific ocean near the international United States - Mexican boundary, and all kinds of geological formations are represented. At Mount Helix, near San Diego, there is a hard blue stone of the massive igneous type, and decomposed granite. Near Orlando is found the white tertiary sandstone and cemented conglomerate so typical of Southern California. Up to the coast line at Point Loma are oyster beds, representing another extreme.

When it came to selecting a machine to do the various excavations in these different materials, Mr. Howard admitted that he considered lots of angles and qualifications. The machine, first of all, had to be rugged enough to stand the punishment of tough excavations and speedy enough to make time in softer going. It had to be economical to operate. In addition to these qualities it had to be light on marshy ground and easy to move from place to place when the short jobs it did were completed.

A Bucyrus-Erie 10-B was selected, equipped to be operated either as a dragline or as a shovel. In addition, a Bucyrus-Erie trailer was purchased, making it possible to haul, load and unload the little excavator in a short time. It worked so well that in a few months another 10-B was purchased to help out with the work ordered for construction. The machine and trailer are towed by one of the 5-yard dump trucks at the gravel plant.

It seems that almost every piece of equipment on the job is equipped with a trailer hitch for towing this trailer. Even Mr. Howard's little ½-ton pickup hooks on to the trailer at times when the machine is unloaded in the congested areas of metropolitan San Diego for a job, and it is necessary to snake the trailer out of there lest one of the nearby patrolmen reach for his parking ticket book.

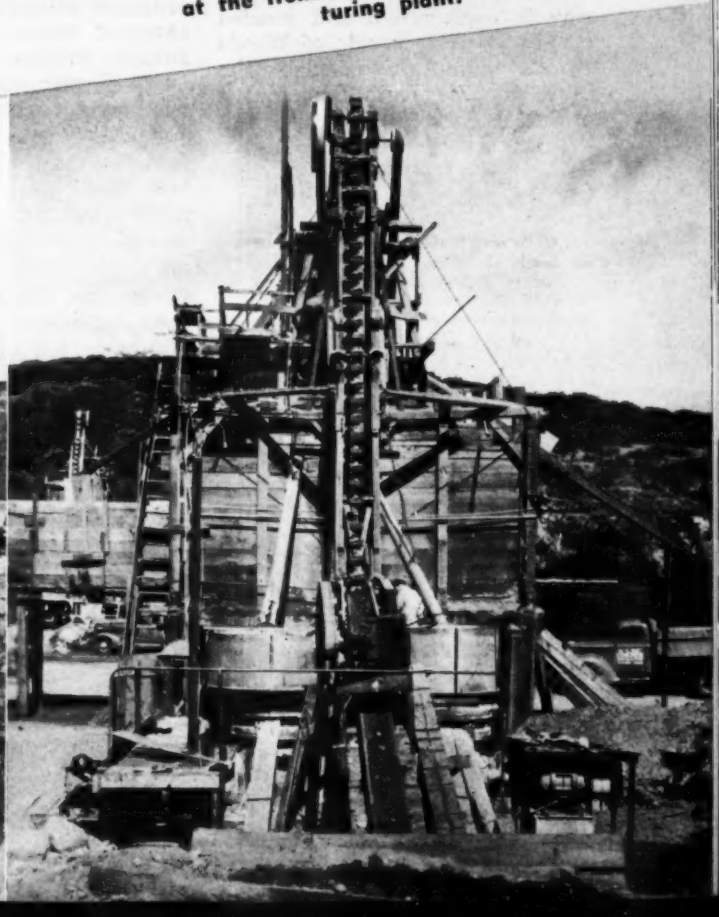
Handles Variety of Jobs

About 540 cubic yards of material in place has been excavated in 8 hours with the shovel, digging

(Continued on page 486)

● General view of the yard headquarters showing aggregate and batch plants and various equipment.

● Looking over the dumping hopper at the front of the gravel manufacturing plant.



Putting in Blast Holes Witha

Drilling blast holes in granite with a water well drill Camarco Contractors, Inc., apply a new method that results in economical yardage through deep rock cuts on the Katonah, New York, state highway job

By SPENCER JONES

FACED WITH the usual problem of making a fair profit out of a low bid, Camarco Contractors, Inc., highway contractors of Ossining and Carmel, New York, have decided to apply some of their quarrying experience to solve it. The low bid was on the shortening, straightening, and reconstruction of a portion of the Amawalk-Woods Bridge Road (N. Y. 769) and a portion of the Woods Bridge-Lewis Corner Road (N. Y. 900), both portions being approaches to Woods Bridge across the Muscoot Reservoir of the New York City water supply system, near Katonah, New York.

Contract Let for $167,197.60

The contract, in amount of $167,197.60, covered work on a total length of 1½ miles of highway through rough and wooded country on either side of Woods Bridge and was awarded by the State of New York, Department of Public Works, Division of Highways, on December 3, 1938, to Camarco Contractors, Inc. Work was started January 18, 1939.

Chief items in the contract were 183,500 cubic yards of unclassified excavation at $.47 (including sand, clay, gneiss and bastard granite), and 4,065 cubic yards of reinforced concrete paving, complete in place at about $10 per cubic yard.

Paving was 22 feet wide, 8 inches thick at the outer edges and 7 inches thick in the center. The mix was 1 part cement, 1¾ parts sand and 3½ parts stone over a gravel sub-base; all according to the standard New York State Highway specifications.

Four Cuts on the Job

The unclassified excavation consisted principally of four cuts, three of them south of Woods Bridge on the Woods Bridge-Lewis Corner road, and the other one north of Woods Bridge on the Amawalk-Woods Bridge road. The first cut south of the bridge was 500 feet long, 48 feet deep, maximum, and required the removal of 36,000 cubic yards of material, 85% of which was gneiss and granite and the balance loose sand and earth. The bottom width of rock cuts was 35 feet and the right of way was 75 feet wide, with slope easements where needed. Slopes were 4 on 1 through rock and 1 on 1¾ through earth and sand.

The second cut south of the bridge was 900 feet long, 58 feet deep, maximum, and contained 80,000 cubic yards of material, only 10% of which was granite and shale and the balance earth and loose sand. In this cut the bottom width was 42 feet, with slopes 4 on 1 through rock and 1 on 1¾ through earth and sand.

The third cut south on the bridge was 600 feet long, 4 feet deep, maximum, and required the removal of only 2,000 cubic yards, all of it earth, to a bottom width of 42 feet and with side slopes 1 on 1¾.

The one cut north of Woods Bridge was 2,388 feet long, 54 feet deep, maximum, and produced 34,000 cubic yards of material, 91% of which was gneiss and granite and the balance earth and loose sand.

If you haven't skipped reading the four preceding somewhat statistical paragraphs, you begin to see what the contractor was up against . . . cuts varying from 4 feet depth through earth to 54 feet depth through hard rock . . . and a very considerable yardage per mile average. In fact, one of the engineers on the job claimed that there was more yardage in the 1½ miles of 22-foot pavement road covered in this article than in any 1½ miles of the famous Storm King Highway with its 46-foot pavement, which was noted for the amount of excavation needed to create it.

The 600 feet of 4-foot earth ex-

● Below: Blasted rock in the cut north of Woods Bridge is loaded out to a 5-yard truck by a 1¾-yard Bucyrus-Erie shovel. Right: General view of the same rock cut, at the left is the old road.

tha Water Well Drill

cavation was, of course, duck soup and was scooped out in jig time by a Bucyrus-Erie 37-B 1½-yard gasoline powered shovel.

Find 10,000 Yards of Gravel in Cut

The 900-foot cut through the 10% rock and the 90% earth and loose sand was almost as easy. Here a 71-X Ingersoll-Rand Wagon drill, an Ingersoll-Rand jackhammer and a Sullivan jackhammer bit blast holes into the granite and shale with the greatest of ease, and the 37-B Bucyrus-Erie Shovel loaded out the blasted fragments, together with the loose sand and earth at rates which varied from 300 to 600 cubic yards per 8-hour day. Incidentally, in this cut the contractor got a lucky break by discovering 10,000 cubic yards of good gravel which was hauled to a storage pile for future use as sub-base under the concrete paving.

It was on the first cut south of the bridge and the cut north of the bridge that the Camarco family began to do some heavy thinking. In these two cuts there was 61,540 cubic yards of rock and only 8,460 cubic yards of earth and sand. Wasn't there some way they could break up that rock economically with the equipment they already owned? Over in a quarry which the family operates under the name of The Putnam County Crushed Stone Company, there was a 21-W Bucyrus-Erie Well Drill making blast holes.

"Why not make the highway blast holes with the well drill?" suggested Thomas Camarco, General Superintendent of Camarco Contractors, Inc. After considerable argument pro and con, it was finally decided to haul the 21-W Bucyrus-Erie over from the quarry to the first cut south of Woods Bridge . . . the 500-foot long, 48-foot deep cut with 30,940 cubic yards of rock and 3,060 cubic yards of earth and sand in it.

There was considerable skeptical comment from neighboring contractors and visiting machinery salesmen when they saw a well drill churning away atop a rocky hill on a highway construction job. "It couldn't make hole fast enough"; "It couldn't be easily portable"; "The bit would need sharpening too often"; "A 6-inch blast hole was too big"; "The rock would come out in chunks too big for a shovel to handle"; and so on

● **Top: Perched on the face of a rock cut the Bucyrus-Erie 21-W well drill sinks 6-inch blast holes. Center: Thomas Camarco actively supervised the Katonah job. Bottom: W. C. Murry, resident engineer, represented the New York highway department on the project.**

● **Left: Rock drilling operations on the Camarco job. The Ingersoll-Rand and Sullivan compressors in the foreground furnish power for wagon drill and jackhammer. Rigging of the Bucyrus-Erie 21-W is visible at the top. Right: Looking north through first cut south of Woods Bridge which is in the background.**

● Another cut on the contract, the rock at the left and the sand on the right offered a variety of digging problems.

and so forth ran the remarks of the critics.

However, the volunteer board of strategy soon found that there was a lot about making blast holes with a well drill that they hadn't heard about.

Although the well drill looked large and unwieldly in comparison with the wagon drills it really was not large when compared with regular blast hole drills. Even the smallest blast hole drills working steadily in quarries ordinarily swing about 2,000 pounds of tools while the customary load for the 21-W well drill is 800 to 1,000 pounds. Although the drill was not doing exactly the type of work it was built for it did prove capable and Camarco Contractors, Inc., proved their complete knowledge of construction methods by adapting what was considered an alien machine to a job that was proving difficult for regularly accepted equipment.

Of course the 21-W didn't make 6-inch hole with a 6-inch bit as fast as other kinds of drilling equipment made 2½-inch hole with a 2½-inch bit . . . but it made enough 6-inch hole through gneiss and granite in an 8-hour day to equal almost as many cubic inches of hole as were made with what seemed to be much faster equipment. The bigger well drill didn't look as portable as the two-wheeled wagon drills, but the contractor hauled it and spotted it exactly wherever he wanted to drill a blast hole . . . without the slightest trouble. And the well drill was all he had to move, instead of a lot of auxiliary equipment.

The 6-inch bit did need sharpening, but only after it had drilled the same depth (usually 1½ to 2 feet) as smaller bits . . . which meant that it made 18 times as many cubic inches of hole per sharpening. That's where one of the big economies came in. Dressing was done at the contractor's shop after the bit made from 1½ to 2 feet of hole.

Six-inch blast holes may have looked big to the skeptical experts, but they could be from 16 feet to 22 feet apart, which meant that about ⅓ as many holes were required per yard of rock loosened and brought down. That was another big economy . . . with the well drill able to make almost as many cubic inches of blast hole per day as other equipment, only ⅓ as many blast holes were required. It practically cut the drilling time 66⅔% . . . and in certain cases as much as 75%.

What's more, the men on the well drill were in no danger of silicosis and needed no dust protective devices . . . even though all the holes made were what an oil driller would call "dusters."

Thomas Camarco, General Superintendent for the contracting firm, supervised the blast hole drilling with the greatest care, insisting that the holes made by the 21-W Bucyrus-Erie be carried down an average of 6 ft. below the rough grade, minimum. This may seem excessive depth, but it certainly paid because there was not a single bit of re-drilling or re-blasting required on the ledge rock of the bottom after the main blasting was finished. In other words, the shovel was able to dig exactly to grade after each blast.

The blast holes varied in depth, of course, from 22 feet to about 60 feet, with an average depth of probably 36 feet . . . depths which the well drill was able to negotiate with ease.

But you can't do snakeholing very easily with a well drill, and you can't do the kind of blasting Camarco Contractors, Inc., did without snakeholing. So, almost horizontally at the base of the cliff the contractor set up an X-71 Ingersoll-Rand Wagon Drill and hammered in snakeholes 28 feet long on 8 to 11-foot centers, with 2½-inch Timken bits on 1¼-inch lugs, at the rate of 14 feet per hour. Bits were discarded after three sharpenings and made 6 inches to 2 feet of hole per sharpening.

Compressed air for the wagon drill and the jackhammers was supplied by an Ingersoll-Rand gasoline powered compressor of 250 cfm capacity and a Sullivan gasoline powered compressor of 315 cfm capacity, both working at 90 pounds pressure.

Loading the Blast Holes

Well-drilled blast holes and wagon-drilled snakeholes were loaded with Atlas or Burton 40% gelatine of which about a carload was used for the job. In the 6-inch blast holes five 4¼ x 16-inch cartridges were first lowered, then came a No. 6 Atlas blasting cap and then the balance of the load for the hole. The loading varied with the depth of the hole . . . from 175 to 300 pounds of explosive. This was ample to lift and shatter the rock, which weighed about 2,700 pounds per cubic yard in the loose.

In the snakeholes 8 inch x 1¼

inch of gelatine were used, and blast holes and snakeholes were stemmed with sand and shot off with a 100-hole battery on a series hookup which shot from 3 to 8 blast holes at a time. The snakehole charges acted as lifters and provided a cushion on which the shattered rock slid outward and down.

There was practically no important secondary blasting to be done on the job. Most of the blasted rock could be handled easily by the shovel without re-blasting and the Ingersoll-Rand and Sullivan jackhammers were used chiefly for drilling big boulders which were not part of the ledge rock. The shattering effect of the heavy primary charges in the well-drilled blast holes, aided by the lifted charges in the snakeholes was almost ideal for the purpose.

Incidentally, the 21-W Bucyrus-Erie Well Drill worked 24 hours per day for one three-month stretch without any time out. In fact, it didn't have a single breakdown during the entire progress of the job, another operating economy not to be sneezed at.

Removing Overburden from the Rock Cuts

There was an average of 5 feet of overburden on top of each of the two big rock cuts. This was shoved up to and over the face of the cliff by a bulldozer on an Allis-Chalmers Model 50 gas-powered tractor and another 'dozer on a Caterpillar Model 60 gas-powered tractor. It was seldom that both bulldozers were stripping overburden at the same time, however, for there was plenty of levelling for one or the other of them to be doing on the various fills. When stripping overburden the bulldozer blade would stick out a foot or two over the edge of the cliff and a niagara of earth would pour down on the jagged rocks below. It was a spectacular method of earth moving.

A diesel-powered 43-B Bucyrus-Erie shovel, with a 1¾-yard dipper, loaded out the rock and overburden from the two big cuts. Fred Todd and Wm. Gay operated at various times, with Jos. Simirri and Roy Barrett as oilers. 500 to 800 cubic yards per 8-hour day was normal operating output of the 43-B in the hard rock.

Four Ward-La France gas-powered trucks and four Bulldog Mack gas-powered trucks, all with 5-yard bodies of various makes (including homemade), hauled away from the 43-B to the fills. Pneumatic tires were used on all trucks . . . 40 inch x 8 inch on the front wheels and 50 inch x 10 inch duals on the rear wheels . . . most of them Lee Tires. The only other trucks on the job were two Fords used for utility work.

Description of Fills

The principal fills consisted of one 700 feet long south of Woods Bridge and one 600 feet long north of the bridge. The 700-foot fill south of the bridge was noteworthy in that it crossed and filled a small cove in the Muscoot Reservoir, reaching a depth of 55 feet with a top width of 38 feet, which with 1 on 1¾ slope angles, made a total yardage of 45,000. This fill's material came entirely from the cuts south of the bridge.

The 600-foot fill north of Woods Bridge was a maximum of 35 feet deep with a 38-foot top width. Having 1 on 1½ slope angles, it contained 43,000 cubic yards. Average haul to fills was about ⅜ mile and about 25,000 cubic yards of excavated material was wasted in spoil pits about the same average distance away from the shovels.

The new highway is drained with some 1,400 feet of reinforced concrete drain pipe, ranging in diameter from 18 inches to 54 inches. Five concrete drop inlets were included in the contract, together with 750 square yards of reinforced concrete gutter at certain points along the toes of cuts.

Paving was done with a Multi-Foote Paver, Model 27-E, one-yard capacity and all sand and stone for paving was produced at the contractor's quarry. Maximum grade of the finished pavement was 7½% located along a short portion of the 900-foot cut, the second cut south of Woods Bridge.

An average of 40 men was employed on the contract, at wages which were under New York State Department of Labor control. A few typical examples of rates follow:—

Unskilled Labor—minimum—$.65 per hr.	Per hr.
Blacksmith's helper	$1.12½
Tractor Operator	1.25
Truck Driver	.87½

Intermediate Grade—minimum—$.65 per hr.	Per hr.
Bulldozer Operator	$1.25
Compressor Operator (Single portable)	1.37½
Compressor Operator (Batteries of 2 or more)	1.50
Grader Operator	1.25

(Continued on page 490)

● A 'dozer shoves overburden over the face of the cut within dipper reach of the waiting shovel.

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FOUNDED 1903

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Devoted to the Excavating Industry

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June Construction Up 13%

The construction industry continued to forge ahead in June at a high level of activity seemingly unaffected by developments in Europe. Total contracts awarded last month in the 37 states east of the Rocky Mountains amounted to $324,726,000, representing a 13 per cent increase over June of last year, according to F. W. Dodge reports. This record gains added significance when it is noted that private contracts rose from $160,721,000 in June 1939 to $177,410,000 in June of this year.

Residential building, which has been particularly strong this year, continued to show an improvement over comparable periods last year by rising from $111,896,000 in June 1939 to $135,274,000 last month. The leading individual class in the residential field continued to be the one-family dwelling built by small home owners with the intention of living in their houses. That this class should bulk so large in the residential total adds stability to the construction industry and optimism to the outlook for a continued high level of work.

Public works and utilities contracts (92 per cent of which was publicly financed) showed a 17 per cent increase in June over the corresponding month last year.

Thomas S. Holden, vice president in charge of statistics and research of the F. W. Dodge Corporation, said in commenting on the June record: "The high level of building activity recorded for June should dispel all remaining fear that the industry will, at an early date, suffer adversely from the economic displacements caused by the war. There may indeed be decreases in certain classes of construction: for example, public improvements of a civilian character—but such declines are likely to be offset by gains in other categories. Manufacturing building, as one example, is likely to continue at a substantial level, reflecting the advancement of the preparedness program. Moreover, government projects for barracks, other defense buildings, are likely to bulk large in the total for the coming months. Industrial plant expansion will undoubtedly create a large demand for individual housing."

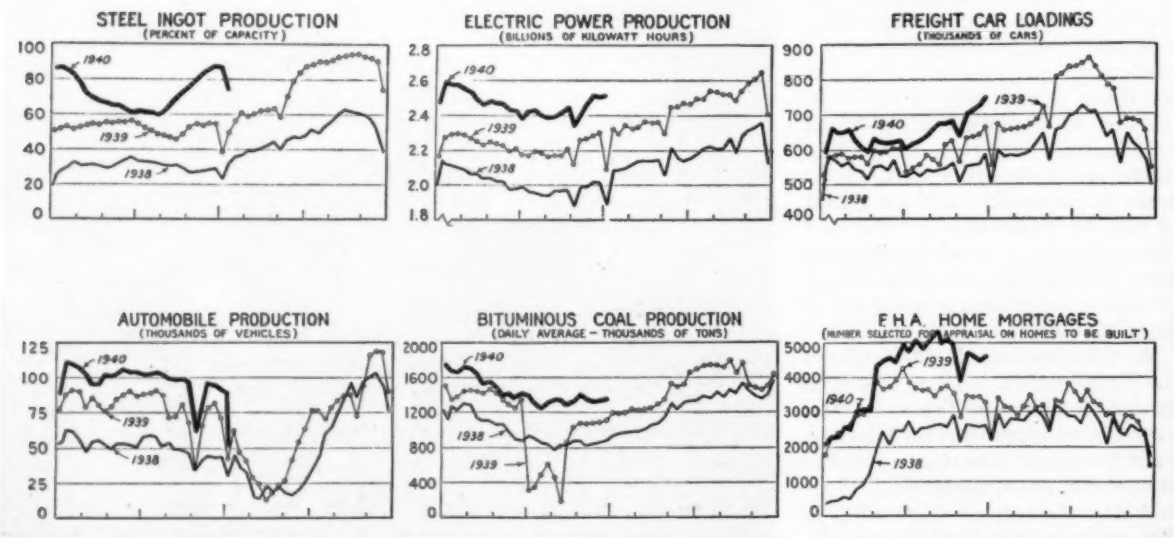
Chinese Superhighway

The Lashio-Kunming road in China is an amazing triumph of highway construction. Two hundred Chinese engineers and 170,000 workers built it. The maximum height is 8,500 feet above sea level, and the average elevation of a considerable portion of the road in China along which motor vehicles have been carrying stores from Rangoon to Kunming (and thence on to Chungking) is well over 7,000 feet, and at times the trucks run above the clouds. At one place the road falls in a zigzag fashion from a height of 7,500 feet to 2,500 feet where it crosses the famous Salween river.

No maps of the route can show the thousand small bridges and the numerous larger ones that are used on this route by the vehicles loaded with supplies for the Chinese. A traveller who followed the footsteps of Marco Polo along the old caravan route over these mountains and rivers said his progress resembled that of an ant crawling in a lateral direction over a sheet of corrugated iron. No sooner was he on the top of a mountain than he had to descend in order to cross a river, and then to climb up again so as to pass over another mountain range.

Owing to the Japanese blockade of the China coast, Rangoon is now the only port with modern facilities for unloading cargo—except those in French Indo-China where goods can be sent for the

WEEKLY BUSINESS INDICATORS



"I told you not to put that sign out!"

use of the Chinese Government.

This new road, called "the life line of China" crosses the "high eaves of Asia," and, for the first time in history, wheeled vehicles now penetrate the 1,000-mile frontier between China and Burma.—*Highway Highlights.*

A new motor highway between Kaunas, capital of Lithuania, and the ex-Polish city Vilno will be completed in 1941. Engineer Baraukas, advisor to the road department of the Lithuanian Communications Ministry, explains that the highway, which will cost 15,000,000 lits ($2,500,000) is to be 100 kilometers long and 18 meters wide.

Modern Highway Equipment Lowers Construction Costs

Over the past fifteen years there have been quite remarkable reductions in the costs of highway construction. In North Carolina, the state highway engineer reports that common excavation, which cost 50 cents a yard in 1920-23, cost only 20 cents a yard in 1939; similarly, borrow excavation has been reduced in the same period from 40 to 20 cents, concrete pavement from $14.00 per cubic yard to $8.75, 18-inch reinforced concrete pipe from $2.12 a lineal foot to $1.53, and reinforcing steel from 5.88 cents a pound to 4.82 cents. Further, he says that similar reductions are general all over the United States, according to the Public Roads Administration.

In other words, we are getting a road today for about half what the same type of road cost 15 or more years ago; as a matter of fact, we are getting a far better road, because engineering also has improved and our highways today are smoother, safer and better able to stand the wear and tear of traffic and the elements.

Three groups are responsible for this lower cost—the highway contractor, the manufacturer and the engineer. Their vision, resourcefulness, courage and determination to improve their product, their design or their output are saving the taxpayers a lot of money.

—*Public Works*

The Test of True Greatness

The real power of the man of true greatness lies in the sterling quality of his character. The reputation of a great man may be attacked, his sincerity and integrity may be questioned, his motives and purposes may be misrepresented and his honesty may be impugned, by those who resent the power of greatness; but no such attack, question, misrepresentation or opposition affects the character. Reputation may be ruined by the evil-tongued slanderer who works secretly and in the dark, but character cannot be reached or marred by this method of attack. Mark well the character of the man.

Steam Shovels

By Frederick W. Branch

I DON'T believe the first steam shovel grew
In some inventor's calm, creative mind,
Or that his uninspired pencil drew
The sketch from which it was to be designed.
Instead, it must have hatched out of a dream
In which he saw its real progenitor:
A giant, spike-toothed clamshell, breathing steam,
Perched high upon a long-necked dinosaur.

They're fascinating things, these hybrid brutes.
Their throatless mouths are always open wide.
Deliberate, they gorge on sand and roots,
Swinging their great, blind heads from side to side.
They dig deep pits and wallow in the muck
Of caving banks and seams of sticky clay,
Lifting their dripping snouts to heap a truck
Or snatch a dynamited ledge away.
They shake and snarl, they clank and grind and blow,
Scraping blunt muzzles up the cut's raw face,
Than waddle forward, clumsily and slow,
To find themselves another grubbing place.

Here where the narrow road winds up a hill
They've sidled off to break a broad, new way,
And sweep its rhythmic curves by cut and fill
Across the pastures where they feed today.

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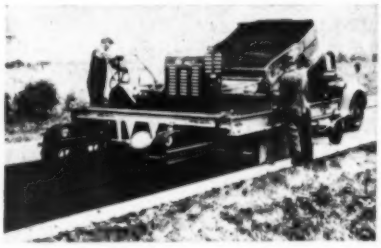
Equipment

you ought to KNOW ABOUT

Shunk D-K Machine

The new power driven model of the D-K spreader and finishing machine, recently announced by the Shunk Manufacturing Company, Bucyrus, Ohio, is reported to be giving a good account of itself on road surfacing jobs in Ohio.

One of the big advantages claimed by the manufacturer for the new machine is its ability to



lay a smoothly finished mat of surfacing material over badly worn and rutted roads and streets without need of any preliminary scarifying of the old surface or any filling of holes. Another feature of the design of the machine, according to Shunk Manufacturing Company, is the adjustment for height of the two front wheels. Either wheel may be set to run at a level above or below the opposite wheel to compensate for differences in the subgrade or old surface. Extra wheels are supplied for use in transporting the machine from one job to another. Power for the machine is supplied by a four-cylinder, water cooled industrial type motor. Drive is through a truck type transmission and separate reverse which provides five speeds both forward and reverse. Two or three wheels in each crawler unit are driven through a truck type differential. Ample power is available for operating on any grade. For further information contact the above company.

Safety Equipment

Two new pieces of safety equipment have just been announced by the Mine Safety Appliance Co., Braddock, Thomas & Meade Streets, Pittsburgh, Pa. Model 2 of their "Explosimeter" combus-

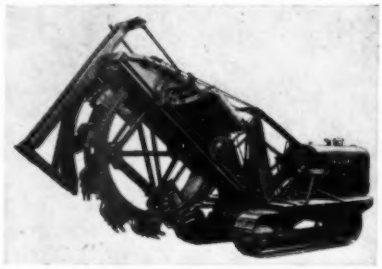
When writing to manufacturers please mention Excavating Engineer.

tible gas indicator and an all-vision facepiece for the M.S.A. all-service gas mask are the new additions to the company's line. Copies of the gas mask bulletin No. EA-6, and model 2 "Explosimeter" bulletin No. DN-4, containing complete details and information, may be secured by writing direct to Mine Safety Appliance Co., at the above address.

Buckeye Trencher

The Buckeye Traction Ditcher Co., Findlay, Ohio, has announced an addition to their line of rotary wheel type and boom type trenchers, a wheel type machine, designated the model 12A.

Following is a list of features as claimed by the manufacturers. The excavator wheel frame is of a new "trussed bridge" construction which provides greater strength and resistance to distortion than former designs of equal weight. A "fluid coupling," which is optional equipment, protects transmissions from sudden shocks and prevents



engine stalling. The conveyor belt has new type of belt guide clips, developed by Buckeye, which insure even tracking of belt, at the same time minimizing belt and pulley wear. The excavator's final drive is the Buckeye constant center type which eliminates the need for idlers to take up the chain slack and provides a smooth flow of power at any digging depth of the excavator wheel.

The new model 12A cuts trench up to 26" wide and up to 5'6" deep. Overall width (exclusive of spoil conveyor) is 6'8"; overall digging height is 8'1¼". A wide range of cutting feeds, conveyor belt speeds and travel speeds are provided for all types of work.

Bulletin 46, just published, gives specifications and further facts and may be obtained by writing to the above company.

New Scraper

R. G. LeTourneau, Inc., Peoria, Ill., introduces its latest single bucket Carryall scraper — the model LS — rated at 8.2 cubic yards struck capacity and 11 cubic yards heaped.

According to the manufacturer, several new features are incor-

porated in this new model. A longer and steeper blade base, which causes material to boil in, higher sides and a built up apron which retains full loads and prevents spilling, and a newly designed "A" frame which gives more room for bigger loads. With the apron cable dead ended on the apron, all hoist and unloading cables are now placed up and out of the dirt. The power demands of larger loads are reduced by centering fixed sheaves at the tailgate so that a direct pull is attained on the positive ejection tailgate. At the option of the purchaser, the model LS Carryall can be fitted with either four or six large tires.

Chrome Face Tape

Chrome Face is the name of the line of steel measuring tapes that has just been put on the market by the Lufkin Rule Company, Saginaw, Michigan. Two features claimed by the manufacturers are that their markings are durable as well as easy to read. According to the Lufkin Rule Company, they

$1,300,000 worth of CONFIDENCE

Contractors building the Pennsylvania Turnpike placed confidence in Koehring Heavy-Duty Construction Equipment to the extent of more than $1,300,000. Koehring equipment was used at the very beginning of excavating and grading operations, through the pouring of the slab and finishing of the slab surface.

Confidence, that Koehring Heavy-Duty Construction equipment would, under the high speed Turnpike schedule, carry the load of the extra-service hours without serious interruption of production schedules, is the reason why so many contractors felt secure with Koehring equipment.

To have received this recognition of quality, to have been a part of this modern construction masterpiece, the Pennsylvania Turnpike, is an honor we humbly accept as a vindication of our policy of building quality and service into Koehring equipment.

Many more millions of dollars worth of Koehring equipment is being used daily throughout the country, helping contractors make profits. If you are not a user of Koehring equipment, be sure to obtain complete information about it, before you purchase your next unit — for excavating, hauling, mixing concrete for highways or structures, and other related operations.

KOEHRING COMPANY
MILWAUKEE, WISCONSIN

are accurate steel tapes, chrome plated, with jet black markings and satin chrome-white surface, free of glare, and the permanent markings stand out in sharp contrast, showing up well even in poor or artificial light.

Chrome Face tapes in cases are now offered in two brands: "Anchor" in 3/8 inch and 1/2 inch width, in genuine leather case; and "Leader," the popular priced line, 3/8 inch wide, in durable and attractive, imitation leather case. Included also are Chrome Face 3/8 and 1/2 inch wide tapes and metal frames with plumb bob for tank gaging in the oil industry.

New Porta-Crane Line

Porta - Crane Corporation of Rapid City, South Dakota, manufacturers of portable hoisting cranes, announce an improvement in the junior line of Porta-Cranes.

All three junior models, A-40, B-40 and C-40, are basically the same in construction and differ only in the accessories which are added. Junior Porta-Cranes are

all-steel construction and are arc-welded throughout. A two level hitch allows easy coupling to either a truck or tractor. Choice of single or dual wheels and pneumatic tires. Besides the standard boom length of 20 foot, two other lengths, twenty five and thirty foot, can be secured. All three junior Porta-Cranes are rated to lift a maximum load of five tons when crane is properly counterweighted with truck or tractor.

Complete information and prices can be obtained direct from the manufacturer, Porta-Crane Corp., Rapid City, S. Dakota.

Improved Earth Drill

The new Buda-Hubron earth drill, manufactured by the Buda Company, Harvey, Illinois, is the latest addition to their line of earth boring machines. Powered by a four cylinder, 40 H.P. water cooled engine mounted on an automobile chassis, this earth drill, although designed for a military purpose, can be used in construction work.

According to the manufacturer, these earth drills are able to dig, in ordinary soil and soft rock, a 20-inch diameter hole, six feet deep in three minutes and a 20-foot deep hole in twenty minutes. The

Buda Company also states that they are capable of drilling holes from 12 to 42 inches in diameter and up to 24 feet in depth, and special machines are capable of drilling holes up to 50 feet in depth. Holes can be drilled at an angle of from 15 degrees for and aft of platform and sideways, either right or left, to an angle of 45 degrees.

The United States Army has started supplying its regiments with these earth drills for the purpose of drilling holes underneath roads, bridge foundations, railroads, etc., preparatory to placing explosives, anti-tank traps or land mines if and when such an occasion should present itself. The drill will also be used to hasten the construction of temporary bridges, foundations for barracks and artillery emplacements.

Stopehamer

Ingersoll-Rand has just announced a new 116 pound "balanced for easy handling" Stopehamer with automatic rotation, known as the R-58. The center of gravity of this Stopehamer is such that the machine assumes a natural drilling position when it is picked up. This facilitates raising the machine to any operating position. Other features claimed by the manufacturer include: feed-leg control which permits many fine variations in feeding power; short over-all height of only 59 inches prevents the drill from being top-heavy; a plate-type throttle valve provides half throttle position for "collaring" holes; and the location of the exhaust on the opposite side of the cylinder from the operating controls. One of the many durability features of this Stopehamer is an automatic chuck cleaning system which keeps the drill free from cuttings and water and at the same time provides ample lubrication for all fronthead-bearing surfaces.

An eight-page illustrated booklet, including a disassembled view is available from Ingersoll-Rand Company, 11 Broadway, N. Y., or any of its branch offices. Send for Form 2647.

Big Beam No. 700

U-C-Lite Manufacturing Company, 500 North Dearborn Street, Chicago, Illinois, announce a new addition to their line of portable lamps—Big Beam No. 700. The manufacturer speaks very highly of the new low-priced light, among other qualities, claiming long battery and long bulb life; low initial cost and upkeep; enduring quality; excellent appearance; light weight; convenience and wide utility.

Flashlight Bulb Extension

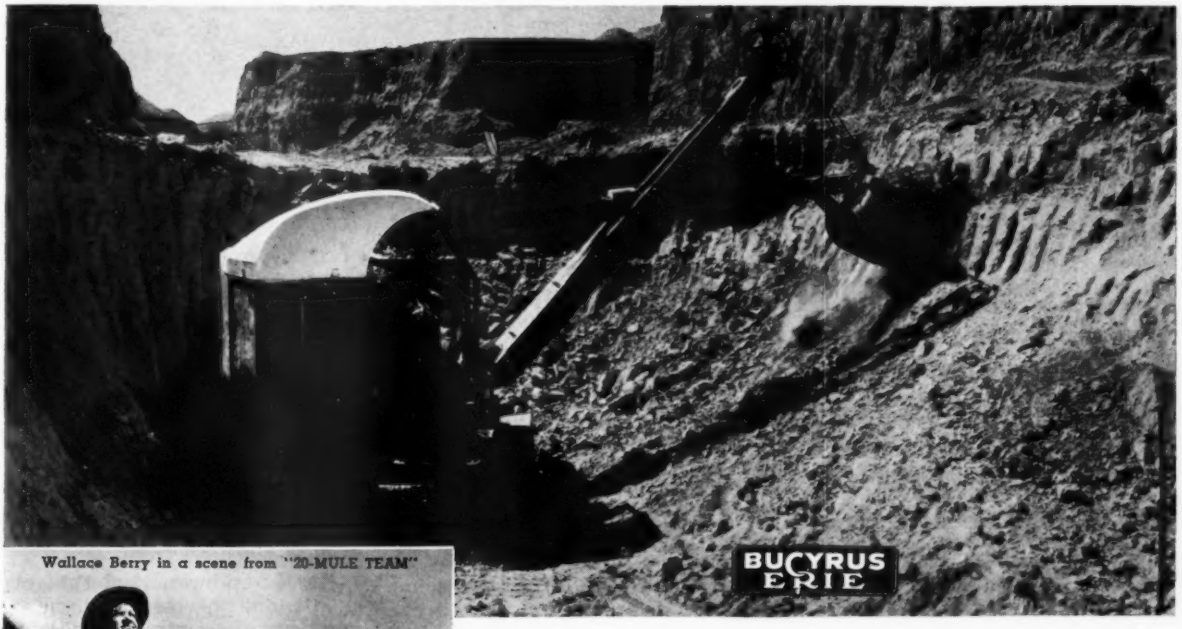
When light is necessary in hard-to-get-at places such as crevices, down in drilled holes, etc., and for inspecting restricted openings between walls, and other such places,

excavators frequently have no means of extending light through the narrow area. For this purpose a novel flashlight bulb extension has been developed by the Sierra Aircraft Company, Sierra Madre, California.

The extension is made in lengths from 6" to 36" and can be extended in multiples. The plug end screws into any flashlight and the bulb is screwed into the opposite socket. To make inspection of complicated machinery or earth formations the operator shoves this device through to the desired location. It can be bent to go around obstacles or shaped as a hook or stand to stay in any position.

A scene from the Metro Goldwyn Mayer Production — "20-MULE TEAM"

115 degrees *in the blazing Sun*



Wallace Berry in a scene from "20-MULE TEAM"

Loading gypsite (without blasting) in California desert country, this ⅜-yard 10-B has averaged 100 yards per 8-hour shift. In 3 years of this tough digging, the 10-B has not had a single major breakdown. During summer months, the temperature frequently hits 115 degrees for days at a time, and seldom drops under 100 for 6 months. If you don't know what heat like that is, you can get an idea from watching Wallace Berry pour water over his head in the M-G-M picture, "20-Mule Team," whose Death Valley setting is very similar to this 10-B's "location." In all kinds of digging, all over the world, the 10-B has proved it's a star. It will pay you to find out what it can do on your work.

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

Field NOTES

Injuries to Trespassing Children

A ten-year old boy in Pennsylvania was either playing in the bottom of an open sewer ditch that extended along the center line of a street, or was walking along its edge, when a section of the surface of the street slid into the ditch. The accident occurred late one afternoon after working hours. He was seriously injured and a jury awarded him $7,500 as damages, in a suit against the sewer contractor. But the Supreme Court of Pennsylvania ordered a new trial of the case, on the ground that the trial judge erred when he instructed the jury, in effect, that even if the boy was trespassing on the bottom of the ditch when the accident occurred, the defendant contractor owed him a duty to adopt precautions against such accidents.

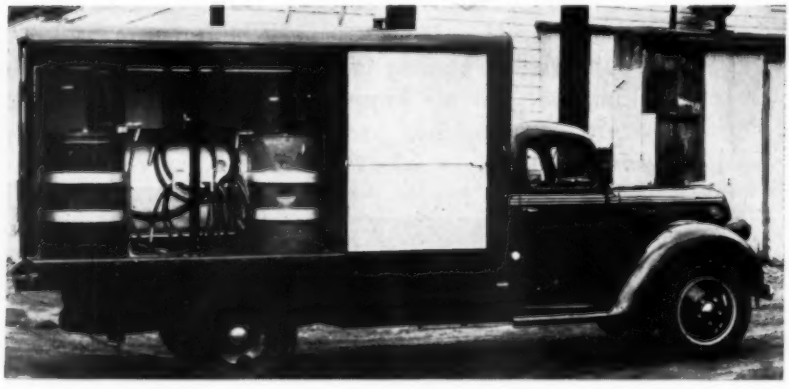
The trial judge applied to the case what is known in law as the "attractive nuisance" doctrine. This legal doctrine states that one who maintains a condition that naturally attracts children is bound to use reasonable care to safeguard them against injury. For example, if a contractor were to leave a power shovel easily accessible to playing youngsters and in such condition that by pulling a lever some prankish youth might set mechanism in motion, the contractor would be apt to be held liable for any resulting injury.

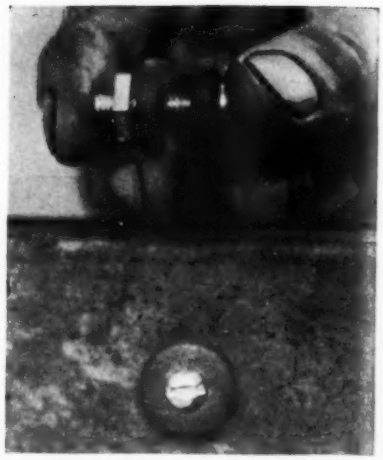
The Pennsylvania Supreme Court said: "To apply the 'attractive nuisance' doctrine to road or street excavations would impose upon contractors a heavier burden than they could reasonably bear. * * * In the instant case defendants and all others engaged in like business must in the normal course of their business excavate numerous long ditches. To require them to fence in all such areas or to take other precautions to protect trespassers would involve a prohibitive expense and would unduly impede them in the efficient carrying out of their work." (Powell v. Ligon, 5 Atl. (2d) 373.)

The ditch in question was six feet wide, 270 feet long and was ten feet deep where the accident occurred, about the middle of the block. There was a barrier at each end of the ditch, and on one side there was a shoulder of excavated dirt, but no barrier on the side where the boy approached the ditch.

It is to be noted that the Supreme Court merely decided that if the boy was trespassing in the ditch the contractor could not be held liable for failing to use some means to keep children from trespassing in the ditch. The court does not say that the boy could not recover damages if he was walking with reasonable care near the ditch and was precipitated into the ditch through a cave-in resulting from the fault of the contractor in failing to either shore the ditch or place a barrier at the point where the accident occurred.—*Arthur L. H. Street, Attorney at Law*

● The Inland Construction Company of Omaha, Nebraska, find it easy to give their equipment on-the-job servicing with this traveling Ford-mounted Alemite service station.





● A before and after view of a handy emergency patch that will "stay put."

Handy Emergency Patch

One of the most frequent causes of delay and aggravation about the job are unexpected leaks in sheet metal tanks and other necessary water containers. The usual method of repair is of course with two pieces of rubber sheeting and a small stove bolt. However, where the hole is uneven and cannot be handily straightened out, the usual pieces of light rubber sheeting do not afford a very satisfactory job, particularly when a bit of pressure is behind the patch.

Handy and practical things to keep for such emergencies are a number of common, soft but tough, rubber water tap seats, with a bolt which snugly goes through the small hole in the center of them. —*Frank Bentley.*

What to Do for Poisons

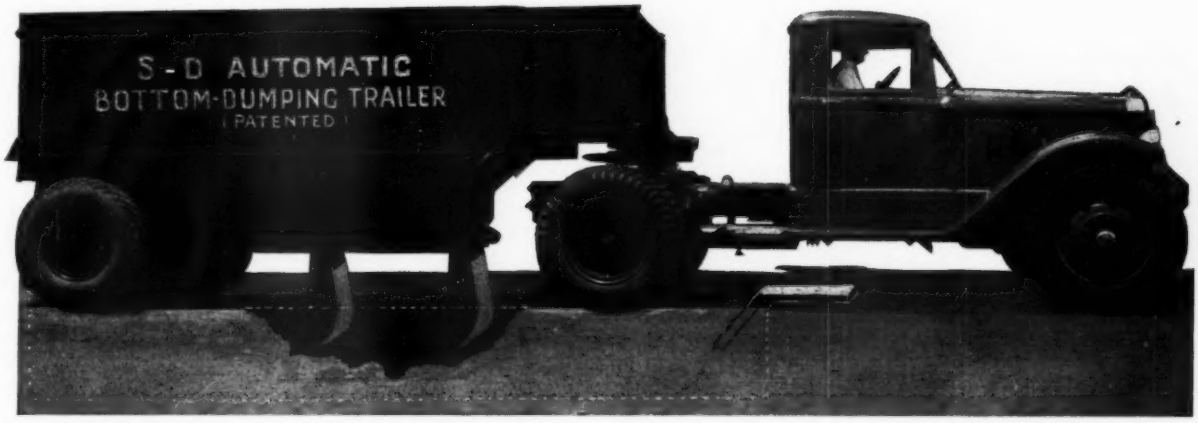
If a person has swallowed an acid, have him drink a quart or more of soapy water. or lime water, or water with baking soda in it. When he can't drink any more, have him hold the solution in his mouth and then spit it out. Continue this treatment until the doctor arrives.

If he has swallowed a caustic poison, have him drink a quart or more of soapy water. Then let him hold lemon juice, or olive oil, or castor oil, or melted butter or lard in his mouth.

If he has swallowed a non-corrosive poison, try to get him to vomit; put a heaping teaspoonful of salt in about a pint of lukewarm water and get him to drink it. Or have him drink milk or black tea.
—*National Safety Council.*

Are You Interested in—

Trailer Transportation?

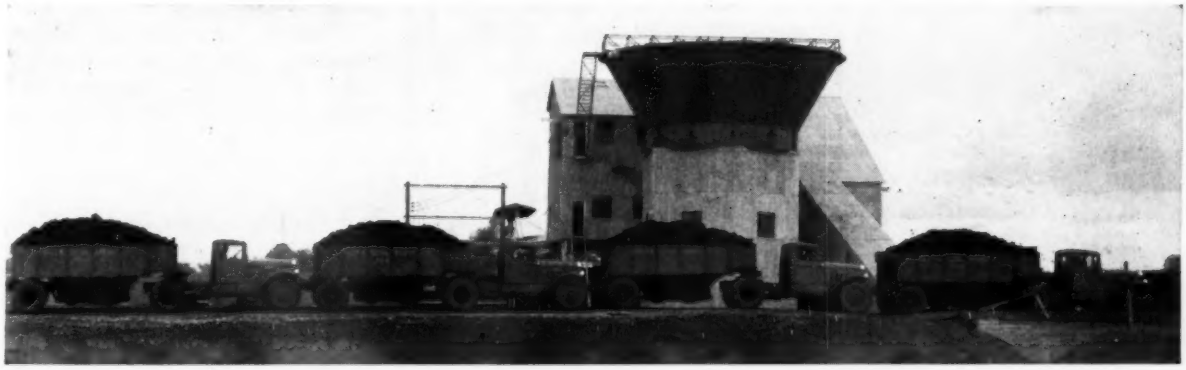


If you are interested in Trailer Transportation, write NOW, for our New Bulletin No. 1255

This completely illustrated bulletin will show you how the famous Sanford-Day principle of automatic bottom discharge mine car has been adapted to S-D Automatic Trailer. It will show you how you can speed up trailer transportation with the fastest, most fool-proof trailer unit on the market . . . how you can save money by eliminating time losses in stop-and-start discharge time and labor . . . how, because of a low center of gravity, it is manipulated easier and faster.

With the S-D Automatic Trailer, maintenance cost is practically eliminated because it's so simple in design; construction is so sturdy. Doors are tripped automatically . . . closed automatically . . . no manual labor whatsoever. An exclusive feature of the S-D Automatic Trailer is its ability to reduce coal breakage at the hopper. The coal is not "dumped" or "dropped" . . . it is actually "layed" down, gently, through one door at a time.

Shown below are four 16 ton S-D Automatic Bottom Discharge Trailers at an Illinois plant. They have hauled and discharged over 2700 tons of coal in a 7 hour day.



MAIL THIS MEMO NOW

Sanford-Day Iron Works, Inc.

480 DALE AVE. KNOXVILLE, TENN.

☐ **I am interested in Trailer Transportation. Mail me your new Trailer Bulletin No. 1255.**

When writing to Sanford-Day Iron Works, use coupon or card bound in this issue.

NOT in the *Contract*

A "Not in the Contract" reader sends in the following actual happening in a Kalispell, Montana, department store:

It seems a lady took her small dog into a department store where she was making a purchase. The clerk who was waiting on the customer happened to look down at the dog, and suddenly kicked it. The irate lady summoned the management who demanded an explanation from the luckless clerk.

He replied, "Well, I saw he had his leg raised ready to kick me, so I decided to kick him first."

Wedding Guest: This is your fourth daughter to get married, isn't it?

MacTight: Aye, and our confetti's gettin' awful gritty.

Oletimer: "Is your married life one grand sweet song?"

Newlywed: "Well, since our baby's been born its been more like an opera, full of grand marches, with loud calls for the author every night."

Elsie—"I heard that Mabel has a propensity for petting."

Stella—"Aw, all she's got is just an old-fashioned sofa like ours."

We heard a yarn about a well oiled conventionite who eased up to a snappily dressed dame and asked her to help him see the town. "I'm a good guy," he told her. "Got dough, Baby, an' I'll sure show you a good time. Only trouble I got, Baby, is I'm a little bit color blind."

"Mistah," agreed the lady, "you-all sho' is."

Definition of a bustle: A deceitful seatfull!

The newest arrivals in the hospital nursery surveyed each other through the sides of the cribs. "What are you, a boy or a girl?" "I'm a little girl, what are you?" "Oh, I'm a boy," proudly. "How do you know you are?" The proud one lifted his nightie—"See, blue booties!"

". . . and why, Mr. Gorp, did the supports for the box forms vary in height? Was the soffit of the deck slab a parabolic curve perhaps?"

No Progress

A western contractor, driving the piling on a large dam near Los Angeles, requires a telegraphic progress report from his office engineer on days when he visits another job in Oregon.

The two pile drivers on his Los Angeles job are called the "Saratoga" and the "Lexington." For purposes of brevity, the office engineer, who must have been a copyreader at some time, became accustomed to calling the machines the "Sara" and the "Lex."

Recently, after some trouble had been encountered in welding the steel guide below the pile hammer which is known as the hammer "pants" in construction parlance, the contractor received this wire:

NO JOB PROGRESS. SARA DOWN 4 HOURS WITH PANTS OFF.

Fellows who drive with one hand are usually headed for a church aisle. Some will walk down it, some will be carried.

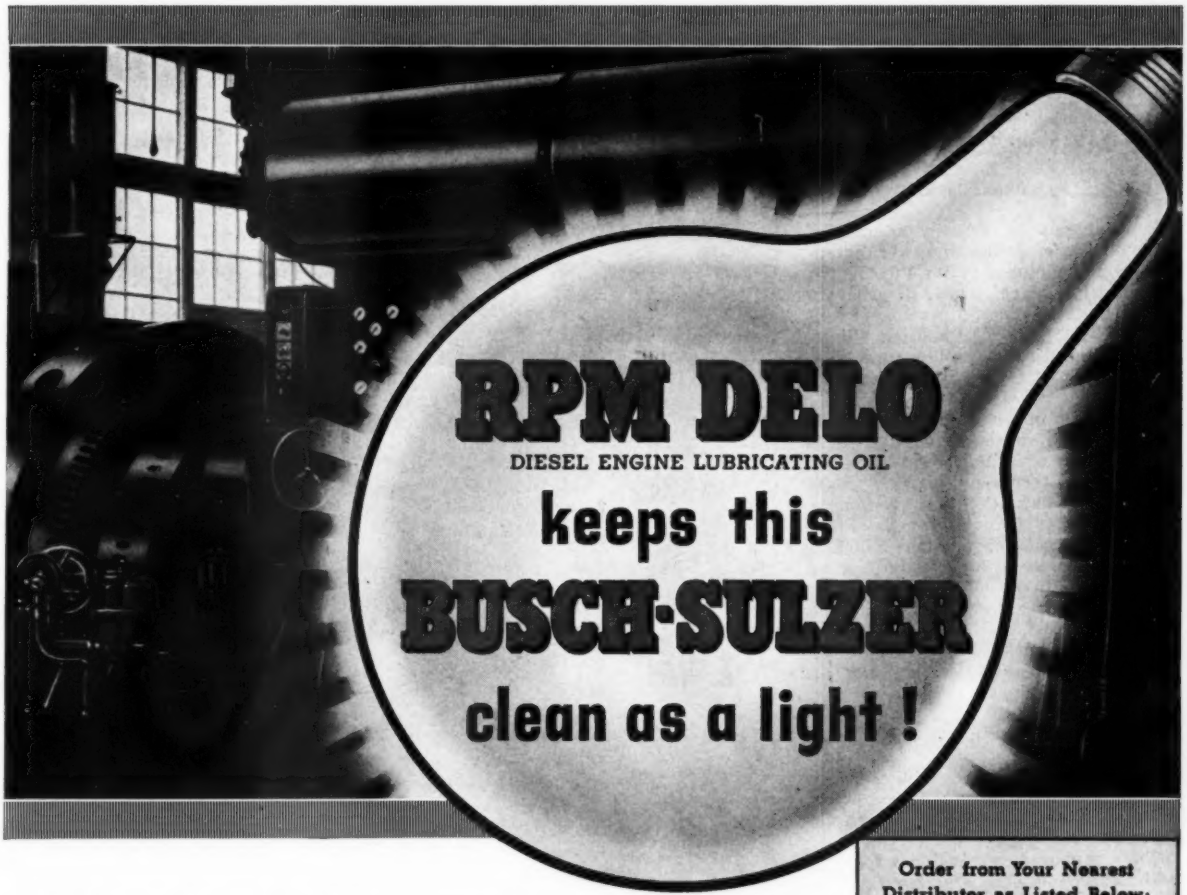
The chief engineer and the master mechanic had spent the evening together. For obvious reasons, the master mechanic was a little hesitant about going home.

"I'll tell you what to do if you don't want to disturb your wife," said the chief. "When you get in the house, undress at the foot of the stairs, fold your clothes neatly, then creep quietly up the steps to your own room."

They met the next morning at the plant. "How did you get on?" asked the chief.

"Rotten," replied the master mechanic. "I did just as you told me. I folded my clothes neatly. I crept quietly up the stairs. But when I reached the top—it was the elevated station!"

A negro preacher had been asked to resign and was preaching his last sermon. "Sistern and Brethern, I ain't gwine to give no long dissuhtation; I tenders my resignation and 'suahs yo' all there ain't no bad feelin's. Ah ain't goin' to say no farewells. But partin' with you sistern and brethern, I'd like to call yo' pussonal and individual 'tention to the location of the piece of mistletoe pinned to my coat as ah passes down de aisle."



With experience like this—it's no wonder Busch-Sulzer Bros., oldest Diesel engine manufacturer in the United States, approve RPM DELO.

For over 8,000 hours this oil has kept a big 1,800 horsepower Busch-Sulzer as clean as the electric light it generates for McMinnville, Oregon. No sludge trouble! No lacquering of pistons! No stuck rings! *And engine wear? The wear rate with RPM DELO has been so low that it is now being used exclusively for all Diesels in the McMinnville plant.*

Says M. H. McGuire, General Manager—"It is our opinion that this lubricating oil is essential to the most satisfactory operation of our engines *burning heavy fuel.*"

Busch-Sulzer engines have proved RPM DELO, not only in field service, but in factory tests, too. Trouble-free break-ins, test run after test run from no load to 25% overload convince Busch-Sulzer Bros.—"RPM DELO is very satisfactory."

Use it in your Diesels—any make, any size—to lower costs, raise operating profits.

RPM
REG. TRADE-MARK
DIESEL ENGINE LUBRICATING OIL

Unequaled for every Diesel

Order from Your Nearest Distributor as Listed Below:

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RPM DELO:
The California Company (Montana only)
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Standard Oil Company of California
Standard Oil Company of Texas
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Diol RPM DELO:
The Carter Oil Company, Tulsa, Oklahoma
Colonial Beacon Oil Company
Standard Oil Company of Louisiana
Standard Oil Company of New Jersey
Standard Oil Company of Pennsylvania

Kyso RPM DELO:
Standard Oil Company (Inc. in Kentucky)

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RPM DELO is available through distributors in more than 100 countries.

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Shots from the FIRING LINE

Plan Military Superhighways

By Bethune Jones

Pennsylvania is virtually assured of receiving federal financing for extension to Philadelphia of its Pittsburgh-Harrisburg superhighway, it was revealed in Harrisburg July 8 by Pennsylvania Turnpike Commission Chairman Walter A. Jones following a conference with Governor Arthur H. James.

The federal government might underwrite the project either as part of a huge system of military roads, or by purchasing turnpike bonds, Jones stated. The latter course would be similar to that followed for the Pittsburgh-Harrisburg section, the $70,000,000 cost of which was partially financed through sale of $40,800,000 bonds to the RFC. The balance of the original link came from PWA, since gone out of existence.

Details of plans for extension of the Pennsylvania super road were explained to Governor James, who took them under advisement. The recent special session of the State Legislature approved the turnpike extension and at the same time gave the Governor veto powers in lining up the route to be followed.

The proposed extension, together with the 160-mile Harrisburg-Pittsburgh section now nearing completion, may be used as a nucleus of a network of military highways linking large industrial centers east of the Mississippi, according to Chairman Jones, who said federal authorities are giving "the most serious consideration" to his plan for such a system.

"The defense agencies at Washington, I have been informed," Jones said, "may take up the whole system of military, self-liquidating super-highways which I outlined in an address at Chicago last January."

At that time, Jones proposed the expenditure of $860,000,000 to build:

1. The Pennsylvania Turnpike from Pittsburgh to Philadelphia, involving only an additional outlay of about $50,000,000 (this estimate has been changed to $70,000,000) to extend the pike from its present eastern terminus at Carlisle, near Harrisburg, to Philadelphia.
2. A highway from Richmond to Boston, via Philadelphia, at a cost of $310,000,000.
3. A western extension of the Philadelphia-Pittsburgh pike to St. Louis, at a cost of $250,000,000.
4. A western extension of the Philadelphia-Pittsburgh pike to Chicago at a cost of $188,000,000.
5. A link from Chicago to the Pittsburgh-St. Louis superhighway, intersecting near Indianapolis, at a cost of $62,000,000.

Although when he spoke in Chicago it was Jones' plan to finance the network of highways through collection of tolls, as is planned for payment of the new Pennsylvania Turnpike, he is reported now to hope the federal government may adopt the whole scheme as part of its defense program and build the road system with funds appropriated for that purpose.

Military observers have pointed out that such a highway network would be of inestimable value in the swift transportation of troops and movement of the planned mechanized units of the Army in case of invasion. It would also be of great value in speeding industrial production programs by affording improved transportation between major cities.

Jones announced in response to queries here July 8 that the Pittsburgh-Harrisburg section of the Pennsylvania superhighway would be completed in "six or eight weeks." Construction problems would be much smaller on the eastern end of the highway, he explained.

Although the cost of extending the highway from Harrisburg to Philadelphia was at first estimated at $50,000,000 figures cited recently have increased to nearly $70,000,000. The latter amount was cited by Jones in May when he urged the Legislature to authorize the extension project.

● **Top: Engineering ingenuity is used to carry Canada's Queen Elizabeth Way through a swamp. Fill corresponding to the depth of the swamp is laid on the surface and then dynamited. Below: After the blast which has forced muck from beneath the fill allowing it to settle on a solid bottom ready for grading operations.**

Blasting Fill In Place

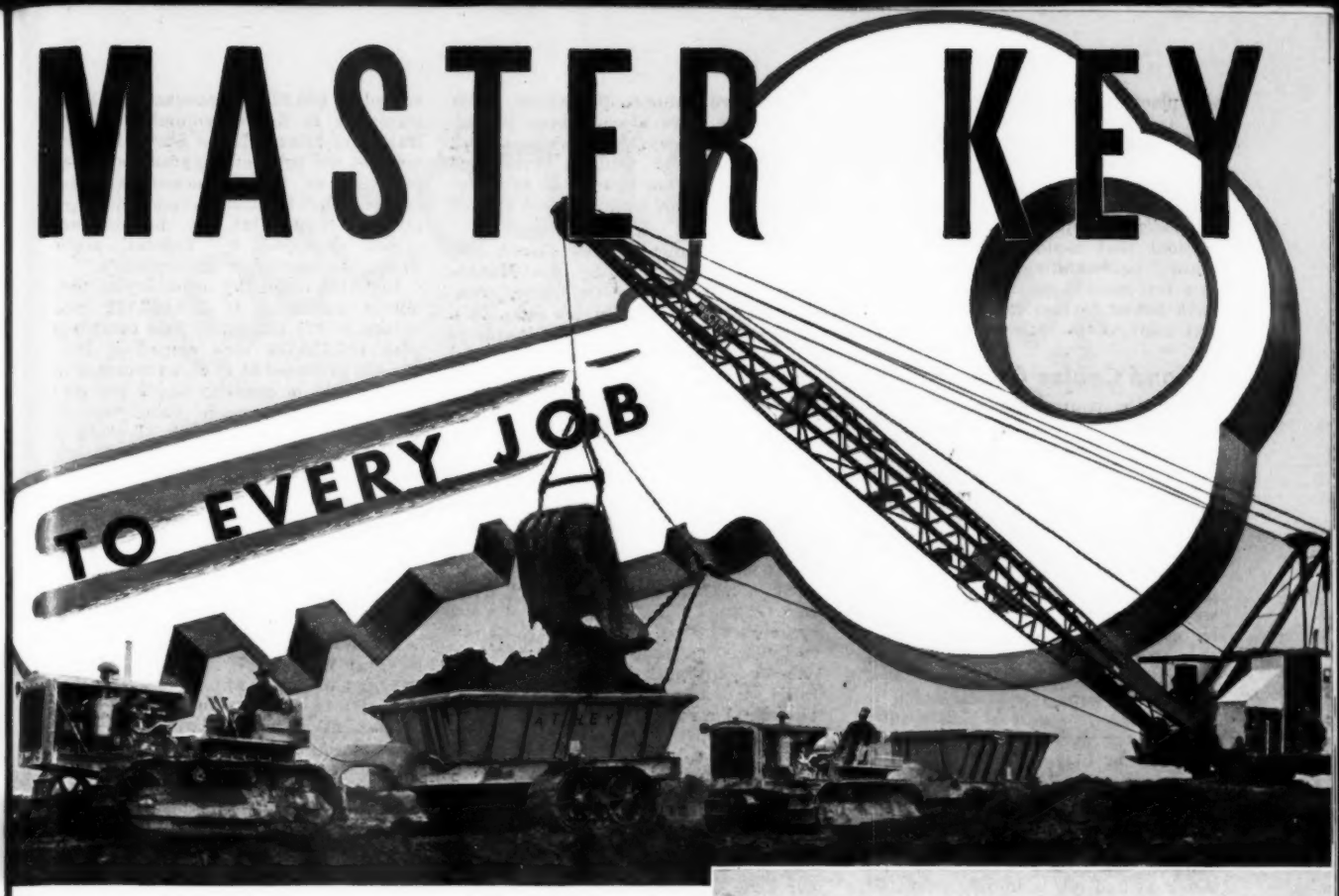
One of the most unusual methods of road construction ever employed has proved both quick and effective in final grading operations of the Queen Elizabeth Way, Canada's ultra-modern express highway now nearing completion over a 91-mile stretch between Fort Erie and Toronto.

Grading engineers, who have recently completed grading the final section between Fort Erie and Niagara Falls while paving contractors rushed to have the upper seventy miles between Niagara Falls and Toronto ready for traffic before August 23, described the method as a reverse blast. It was used to blow the road down to solid ground in swampy districts.

Wherever they encountered a swamp, or "muskeg," to use the local term, a layer of fill was placed on top. It corresponded in depth with the depth of the muskeg, the extent of which was determined by drilling. Then dynamite

MASTER KEY

TO EVERY JOB



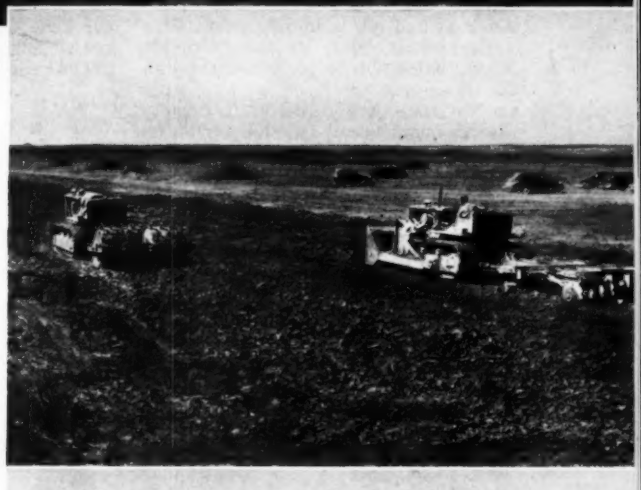
WE TAKE YOU to the International Boundary Commission project, near Rio Hondo, Texas. Master factor in the rapid progress of this notable undertaking is a fleet of sturdy "Caterpillar" Diesel Tractors:

Their power, traction and maneuverability afford wide application to various types of equipment — giving them the versatility to get in on practically every kind of job. . . . They spot wagons under the dragline — run huge loads of pay-dirt over rough or soft haul-roads (or no roads at all) — dump them — spread them with bulldozer attachment — pump water from drainage ditch to wet down dusty fills — pull discs and tampers for thorough compaction. Rain and soggy ground conditions do not stop these powerful broad-tracked, sure-gripping motive power-plants from hauling, dumping and leveling heavy, water-logged earth and clay.

Through perfect co-ordination of tasks and implements, the work goes on CONTINUOUSLY — at a steady, time-saving pace. . . . A fine example of handling big contracts toward quick completion and maximum profit!

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

A



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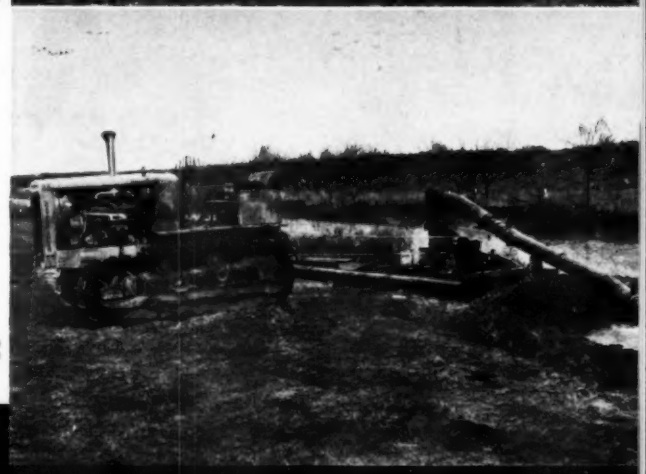


C

A "Caterpillar" Diesel D8 Tractor and Athey wagon combinations hauling material loaded by a 3-yard dragline. Average load, 14.4 yards. On 1700-foot haul, unit averages 5 trips per hour. (No time wasted here . . . as a loaded unit moves on, another is coming up under the dragline.)

B One "Caterpillar" Diesel D8 leveling wagon fills with bulldozer and at same time pulling disc for better compacting. Another pulls sheepsfoot tamper.

C Pumping water with power take-off, to wet down dirt for ready handling. On 6-foot lift from drainage ditch, 6-inch pump moves 1200 gallons per minute.

CATERPILLAR

REG. U.S. PAT. OFF.

TRACK-TYPE TRACTORS • ROAD MACHINERY • DIESEL ENGINES AND ELECTRIC SETS

was placed and exploded in such a manner as to blow the muskeg out from under and allow the fill to settle down. The pressure of the muskeg from either side then held it in place.

Engineers on the job state that the method proved particularly effective in sections that could not be adequately drained before filling and accomplished in a few seconds what otherwise might have taken several months if the fill was allowed to settle naturally.

Grand Coulee Gains Height

With the pouring of one of the topmost blocks, in the east abutment section, part of Grand Coulee Dam reached its heighest elevation to date—550 feet above lowest bedrock.

Other such blocks, fifty feet long and thirty feet wide, will follow rapidly, until by September, both ends of the dam will have been completed. The more difficult work in the center spillway section will have been completed by next year, when motorists will be able to drive three-quarters of a mile along the 35-foot wide highway at the top of the dam. The block which was just completed is part of that roadway.

When the dam is completed and in operation by 1942, America will have an important new source of power, vital to defense needs. Its mammoth power plant will have an ultimate output of more than 12 billion kilowatt hours. This store of hydro-electric energy, unlike coal and oil, is inexhaustible.

The fertile lands of the Columbia Basin, which will be reclaimed through the life-giving waters behind the Grand Coulee Dam, stand ready to supply reserve quantities of food for any emergencies. Forethought and wise planning have made this 1,200,000-acre empire one of the nation's "aces in the hole."

The building of the dam was begun in 1933. Of its ultimate ten-and-a-half-million-yard volume, 10 million yards of concrete have already been placed. The completed dam will require, among other things, 12 million barrels of cement, 77 million pounds of reinforcing steel, and 100 million board feet of timber.

The first concrete was placed less than five years ago by the Mason-Walsh-Atkinson-Kier Company, contractors for the base of the dam. In a little over two years, 4,525,209 yards of concrete had been placed. The contractor actually bettered scheduled time by one year.

Consolidated Builders, Inc., present contractors on the dam, were awarded their contract for completion of the dam, the west power house, and the pumping plant dam, on January 28, 1938, on their bid of $34,442,240. Since that time, they have placed 5,475,000 yards of concrete — enough to make 2,550 miles of standard 20-foot highway. Although this volume of concrete is unprecedented, the contractor broke every world's record in its placing. In one 24-hour period last year, 20,684 cubic yards of concrete were mixed and placed. This record will probably stand for many years to come.

Sand and Gravel in 1939

The total production of sand and gravel in the United States in 1939 increased 7 per cent in quantity and 11 per cent in value, with an output of 194,818,533 short tons valued at $95,224,047 compared with 181,320,233 tons valued at $85,922,847 produced in 1938, according to figures compiled by the Bureau of Mines, United States Department of the Interior. Approximately 40 per cent of the production was accounted for by contractors and construction or highway maintenance crews employed by federal, state, county or municipal governments.

Reported sales by commercial producers amounted to 118,393,120 tons valued at $71,182,558 in 1939 compared with 105,759,786 tons valued at $65,015,878 produced in 1938, an increase of 12 per cent in quantity and 9 per cent in value. The average value was 60 cents per ton in 1939 and 61 cents in 1938. Building sand increased 15 per cent with an output of 26,406,323 tons in 1939 compared with 22,939,683 tons in 1938. Paving sand increased 16 per cent, with an output of 19,468,018 tons in 1939 and 16,755,634 tons in 1938.

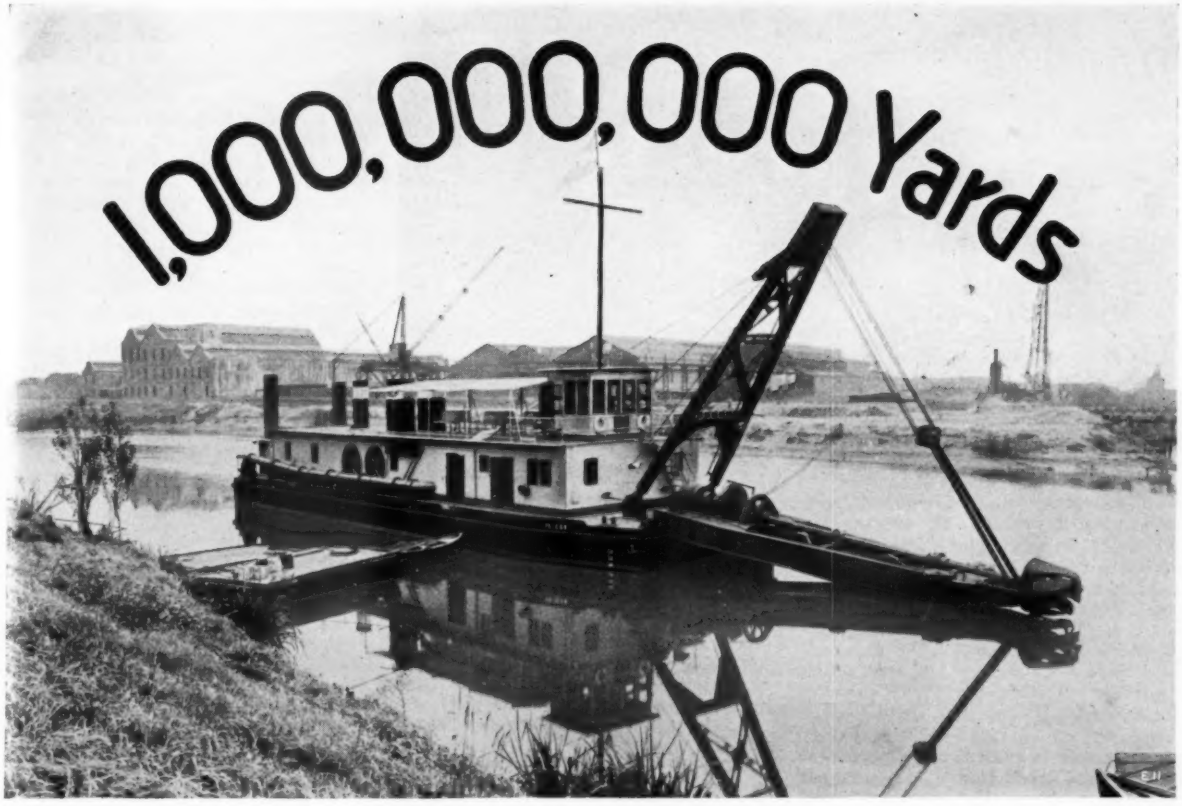
Amounting to approximately 88 per cent of the total commercial production, 103,771,791 tons were reported as washed or screened material with an average value of 64 cents per ton. The average value for unprepared sand and gravel was 31 cents per ton.

Accounting for approximately 90 per cent of the commercial output, method of transportation was reported for 106,367,071 tons of sand and gravel. Of that amount 45 per cent was shipped by truck, 40 per cent by rail and 15 per cent by waterway.

States leading in production of sand and gravel in both 1939 and 1938 were New York, California, Illinois, Ohio and Michigan.

With an increase of slightly more than 1 per cent, the sand and gravel output of government-and-contractor operations (formerly classified as "Noncommercial") amounted to 76,425,413 tons in 1939 and 75,560,447 tons in 1938. Average value was 31 cents per ton

● E. S. Wickstrom of Bound Brook, New Jersey grades the grounds of the United States Soldiers' Home at Washington, D. C. with a 9-yard Bucyrus-Erie scraper towed by an International TD-18.



Over a Billion Yards of Experience In Bucyrus-Erie Hydraulic Dredges

Built in a wide range of sizes, to handle a wide range of materials, Bucyrus-Erie hydraulic dredges have moved over a billion yards. This unequalled experience is built into each modern dredge and is assurance of proven performance in the Bucyrus-Erie dredge you buy. Designed by men who know the problems through experience; built by skilled specialists with the most modern, complete facilities in the world; "tailored" to meet YOUR problems, Bucyrus-Erie dredges have thoroughly proved their mettle. It will pay you to investigate.

Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Co., you will find a card bound in this issue.

● H. R. Miller Company of Lancaster, Pennsylvania, puts its ⅜-yard Bucyrus-Erie shovel to work on a road widening job in Clearfield county for the Pennsylvania Department of Highways.

with approximately 23 per cent of the total quantity washed, screened, or otherwise prepared, at an average value of 51 cents per ton while the average value for unprepared material was 26 cents per ton. Construction and maintenance crews of states, counties, municipalities and other government agencies produced 40,143,981 tons valued at 25 cents per ton, and contractors working expressly for those agencies produced 36,281,432 tons valued at 39 cents per ton. Output by state highway departments accounted for 47 per cent of the total production, counties 21 per cent, municipalities 3 per cent, and other agencies 29 per cent.

"Impossible" Job Completed On Schedule

By Floyd Suter Bixby

On June 13, two days before the scheduled completion date of the first unit of Cahuenga Pass Freeway between Highland Avenue and Mulholland Drive near Hollywood, California, H. E. Cox, Jr., general superintendent for J. E. Haddock, Ltd. picked up his office telephone and exploded a number of adverse theories.

"Well, Albert old boy, she's ready," he said. "She's all done, polished and shined. You can bring on your governor to dedicate the job they all said couldn't possibly be finished on schedule."

Albert D. Basset, the resident engineer on the job for the city of Los Angeles, knew that Cox was right. And because he had watched it, piece by piece, as it was being built under the worst kind of work conditions, Basset was as proud of the completed job as the superintendent.

The 5,000-foot highway job was so highly concentrated near the lower end of the pass that fully 70 per cent of the work lay within an area only 800 feet long. In this work area was a relocated railroad line, with four lanes of the new freeway on either side of the 50 foot railroad right-of-way, an underpass for southbound traffic, and a foot and vehicle bridge across the pass itself at Pilgrimage Play. Add to this the unpleasant fact that a daily average of from 45,000 to 50,000 automobiles had to be routed through the heart of the job and you have some picture of the congested work conditions which made many a construction engineer around Los Angeles say "they'll never finish that one on time."

To start the $761,000 contract off right it rained; a dismal, cold rain which managed to keep the job well slopped up from its opening on February 1 to February 20. But while many of the contractors engaged on public work around Los Angeles stopped their work at that time, Cox did not stop his. He skinned off the sloppy subgrade, obtained permission from the trustees of the famous Hollywood Bowl to get a supply of fine decomposed granite out of the Bowl grounds, and built the 2-foot railroad subgrade in the rain. The rock, which was about the same as coarse aggregate, made an excellent footing and the rain had no chance of halting any of the work.

● California's Cahuenga Pass Freeway during construction operations. At the right the 45,000-yard "shoo-fly" bypasses a heavy flow of traffic.

About 110,000 cubic yards of excavation including a 45,000 cubic yard fill at Pilgrimage Play which was built in 10 days, and a 17,000 cubic yard cut on the east side of the pass was run through in short order. Much of the excavation was blasted off the granite sides of the pass and loaded out by two Lorain shovels. A fleet of Allis-Chalmers HD14, HD10 and Model "L" tractors was used to open up the cuts and to place the fill.

Because the work had to be planned and coordinated in such perfect shape, the Haddock Company employed Alden D. Hunting on the job as consulting engineer. Hunting, who had worked on the Oakland Bay Bridge, designed much of the false-work for the structures in the contract. In addition, a crew of three good surveyors was used. These men roaded the grades, cuts and other construction stakes for the contractor's force to tentatively work to. Setting these survey points in advance of the establishment of official lines by the city's engineers resulted in a considerable time saving. The job was so well planned that not more than 5 per cent of variation from schedule resulted in either cost or work progress.

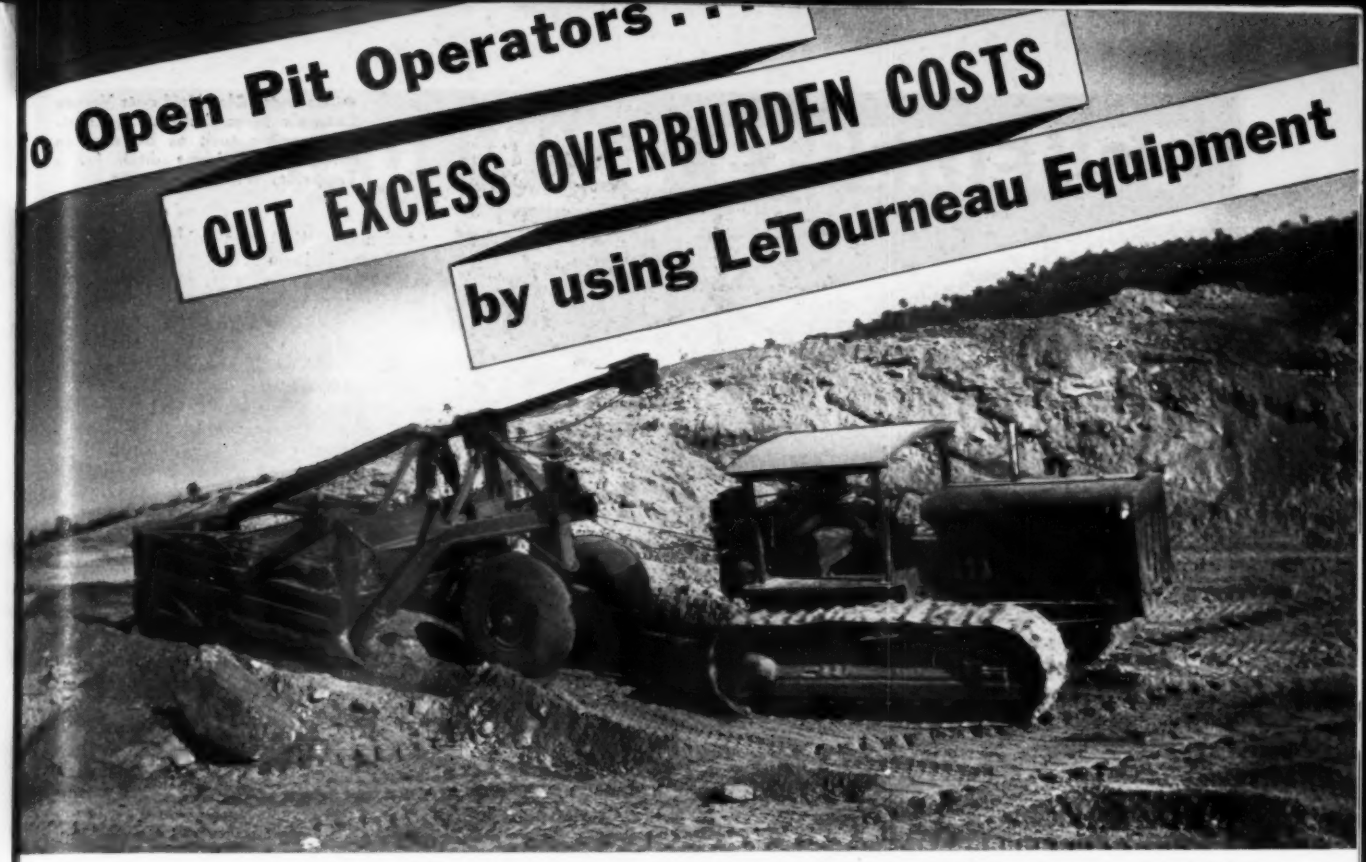
To take care of initial traffic, a 1,600 foot fill, involving the placement of 45,000 cubic yards of material, was put in. Material for the fill was taken largely from the excavation of a road for the Pilgrimage Play Association. This work made a new access to the outdoor theatre where the world-famous Pilgrimage Play is staged.

Some 20,000 cubic yards of concrete were designed in the job, including 7,500 cubic yards of structural concrete. On the freeway construction a Multifoote 27E Paver, a Jaeger-Lakewood tamper and a Johnson diagonal float finisher were used on the pours. Subgrade work was done with a Jaeger-Lakewood subgrader, towed by an Allis-Chalmers HD14 tractor. Two Austin-Western 99 motor graders were also

o Open Pit Operators . . .

CUT EXCESS OVERBURDEN COSTS

by using LeTourneau Equipment



Modern stripping method at Quinto Mine. In addition, this same LeTourneau 12-yard Carryall constructed an earth-fill dam for a tailing pond and built roads.

uban Mining Company Saves on Stripping and Overburden Handling . . with Carryall Scrapers, 'Dozers and Rooters

If you have a tough stripping job . . . like the Cuban Mining Company had at its open pit Quinto Mine, near Cristo, Cuba . . . see how LeTourneau equipment can help you solve the problem and lower your costs.

Selective Mining Made Practical—Profitable

There the irregularity of the manganese ore formations and the heavy overburden removal, necessary to reach some of the productive ore bodies, made regular cuts and benches impractical.

A LeTourneau 12-Yard Carryall Scraper was brought on the job to move dragline spoil back beyond the landslide danger point. It worked . . . so successfully that two more 12-Yard Carryalls have been added. Now they are being used on original stripping, too (see picture above) . . . dumping into mined-out areas.

A LeTourneau Rooter eliminated much blasting in hard formations . . . did the job SAFER . . . faster . . . and easier, by providing complete fragmentation. Two LeTourneau 'Dozers further added to ore production at Quinto by handling the short haul excavation (bottom) . . . clearing new areas to be mined . . . levelling old spoil areas.

LeTourneau Carryalls are complete one-man stripping outfits. Tractor operated, they excavate their own loads . . . carry and dump—all in one operating cycle. Thus, expensive shovels and draglines are left free for productive operations.

STRIPPING IS YOUR BUSINESS . . . CUTTING YOUR COSTS IS OURS

LeTourneau equipment is being used on leading properties from Alaska to South Africa, for pioneering, stripping, hauling materials, building roads and ponds. Results: experience has proven definitely that no other method gives you such low net cost per yard or ton handled. Your local LeTourneau-"Caterpillar" dealer is ready to demonstrate the savings to you . . . right on your own properties. See him . . . NOW!

R. G. LeTOURNEAU, INC., Peoria, Ill., U.S.A., Cable address: "Bobletorno."

E TOURNEAU

CARRYALLS 'DOZERS ROOTERS

Power Control Units, Drag Scrapers, Pushdozers, Sheep's Foot Rollers, Crawler Tractors (Name Reg. U.S. Pat. Off.)

● Operator Olaf Hoff puts Vernon County's ⅜-yard shovel to a typical dragline task as he digs an emergency drainage ditch for a Trippville, Wisconsin farmer.

used on subgrading. Dry batched concrete was sent to the mixer on road construction from the Graham Brothers batch plant, who worked with the Consolidated Rock Products Corporation of Los Angeles in furnishing the aggregates used on the job. For structural concrete, six Jaeger Transit Mix trucks were operated by the Consolidated Rock Products Corporation. Cement and steel reinforcement were delivered and furnished by the Blue Diamond Corporation.

Concrete bearing piles, cast in place by the Raymond Concrete Pile Company, were necessary owing to the depth of the alluvial fill under the piers and abutments of the Pilgrimage Play bridge and for the underpass structure. These piles were placed to a maximum penetration of 49 feet.

Completion of this first unit of the Cahuenga Pass Freeway marks the first step toward a modern, wide freeway capable of accommodating the heavy traffic traveling the main highway out of Los Angeles for San Francisco. The trend in Los Angeles is working rapidly toward the construction of more of these modern high speed highways.

"Farmer In The Dell"

A. L. Jelinek, Trippville, Wis., farmer, was in trouble. His farmlands in the hills of picturesque Vernon county were saturated by abundant underground springs. But the rains came and his gardens and pastures were flooded, each successive rain raising havoc above the level of endurance. So farmer Jelinek had to act and act quick.

To solve the problem, inadequate ditches, creeks and streams had to be deepened and widened. It was a typical small-dragline job but there were no draglines available. The only contractor in the vicinity was digging himself out of a basement job at the other end of the county. Mr. Jelinek finally dumped his problem in the lap of Vernon county commissioners and the county officials felt that after all, when a desperate taxpayer needed help they might do something about it. With most of the county equipment tied up on spring cleaning and road renovating work, dragline equipment just wasn't and neither was any sort of ditching machine or gadget. As a last resort county employees hauled in a Bucyrus-Erie ⅜-yard shovel that was doing handy-man jobs near Hillsboro. They brought along a couple of mats too, since the first intention was to work the ditch from the bottom, this being the usual procedure in shovel work. But the ditch couldn't hold a willow, let alone a mat, so the idea was out due to non-support.

Working from the side and top would be tricky because the muck was very heavy for the low boom angle needed. A decent looking grade could not be assured but above all output was questionable and that might run costs discouragingly high. Farmer Jelinek accepted the county's hourly charge and Operator Olaf Hoff asserted that he would make the job a success for all concerned.

And a successful job it was as may be seen in the illustration. Operator Hoff kept the machine on even keel at all times, and by skillful handling formed a grade that would make any dragline operator chesty. Mats were used but once, while eliminating a sharp turn in the ditch.

To top it off, Hoff dredged out an average of 50 lineal feet per hour, deepening the bed to five feet and widening the top of the ditch to twelve. Farmer Jelinek was extremely pleased. He glowed with satisfaction and the smile on his weatherbeaten countenance spelled a job well done.

Prevent Ft. Peck Erosion

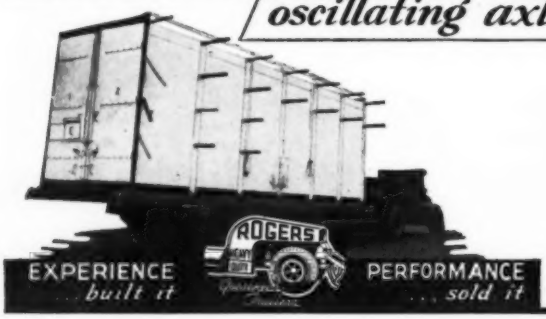
With the completion of approximately 2,400 feet of the east end of the dam by J. A. Terteling and Sons, government forces at Fort Peck have included that portion of the dam in their program to prevent erosion on the downstream face of the dam. Various methods to prevent erosion have been considered by the U. S. Engineers. The method proving to be most economical and effective so far, is the use of a standard basin lister machine.

The lister machine, commonly used

HAULING *of* THIS *Brick-lined* OVEN Possible only with

oscillating axle type of trailer

wrote ROGER SHERMAN *of Hartford, Conn.*



He of course referred to his Rogers "8 WHEEL REAR TRAILER."

In it he had unequalled oscillation laterally and longitudinally, extra wide tread to distribute the load over a wide area and a liberal amount of rubber, all of which combine to assure the least possible vertical movement of the trailer bed with minimum vibration, easier traction and longer life of tires.

136 ORCHARD ST.

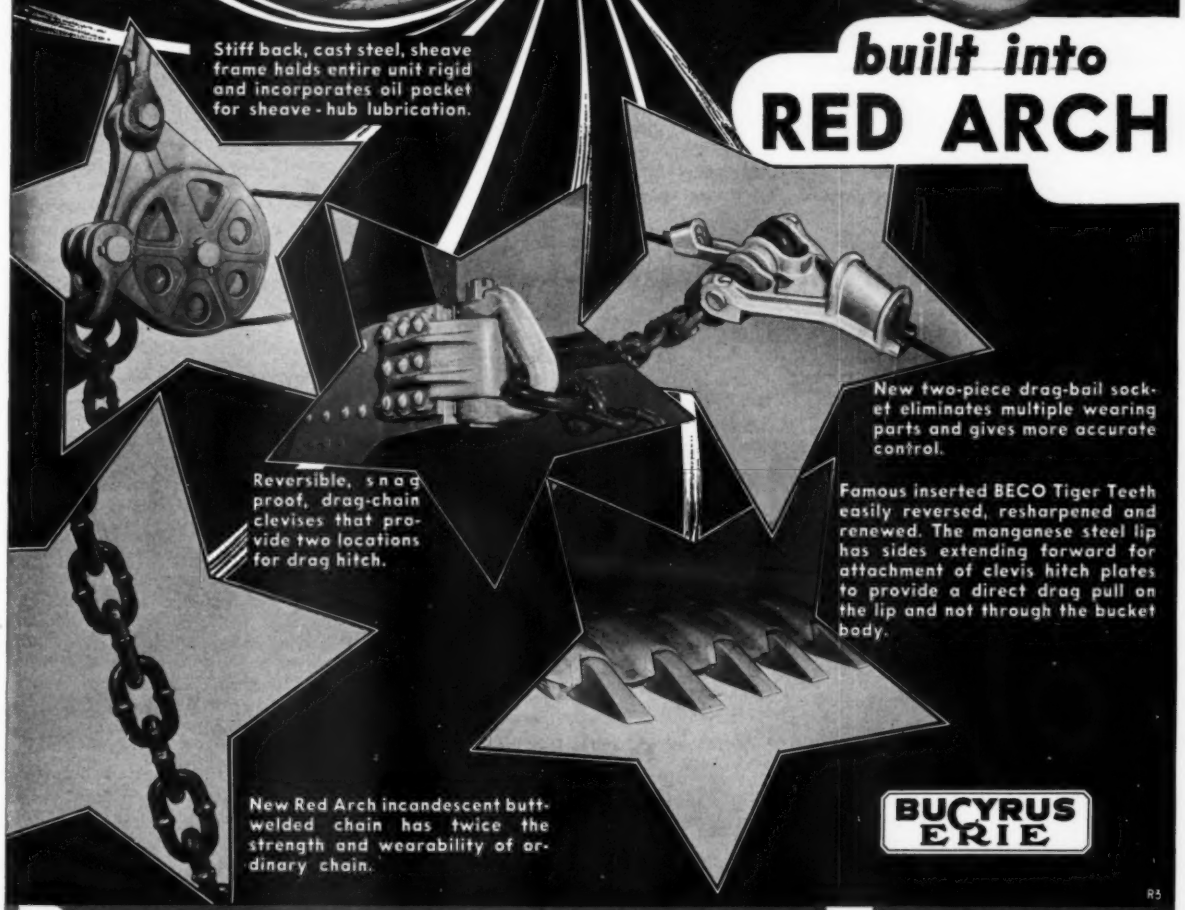
ROGERS BROS. CORP. ALBION, PENNA.

For your convenience in writing to Rogers Brothers Corporation, you will find a card bound in this issue.

WORLD WIDE EXPERIENCE

Stiff back, cast steel, sheave frame holds entire unit rigid and incorporates oil pocket for sheave-hub lubrication.

built into RED ARCH



New two-piece drag-bail socket eliminates multiple wearing parts and gives more accurate control.

Reversible, snag proof, drag-chain clevises that provide two locations for drag hitch.

Famous inserted BECO Tiger Teeth easily reversed, resharpened and renewed. The manganese steel lip has sides extending forward for attachment of clevis hitch plates to provide a direct drag pull on the lip and not through the bucket body.

New Red Arch incandescent butt-welded chain has twice the strength and wearability of ordinary chain.

BUCYRUS ERIE

R5

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

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by farmers to prevent erosion on hill sides, makes furrows about three feet apart, fourteen inches wide and approximately ten inches in depth. A shoe on the outside circumference of the wheels raises the machine with every revolution of the wheel thus leaving a mound of dirt in the furrow about every ten feet. The furrows, or small ditches parallel with the face of the dam collect small basins of water which prevent any large scale erosion.

The riprap facing on the upstream face of the dam makes protection of this type unnecessary in that area.

Coal Production Shows 70% Increase

King Coal, swept along by the accelerated pace of industry, has increased production by nearly 70 per cent in the first five months of 1940 and seems headed for one of the best production years in a decade.

During the last five months, bituminous coal mines in Pennsylvania turned out 43,911,000 tons of coal—some 16 million tons more than the 1939 production, in the same months, of 27,921,263 tons.

At that rate, according to calculations of the State Department of Mines, 1940's soft coal production in Pennsylvania will reach the total of 105 million tons, as compared with 89 millions last year and 76 millions in 1938.

Reopened factories, more railroad traffic and increased production of coke account for the increase in coal production, according to the State Mines officials who point out that coal production rises and falls with industrial activity.

Reports of reopening coal mines in Western Pennsylvania thus were related directly to the increases in manufacturing production brought on by European war orders and by the United States' National Defense program.

Mines officials estimate that bituminous coal is the major source of energy in the country, providing 48 per cent of all the fuel-produced energy, and thus benefits directly by any industrial betterment.

Soft coal production in Pennsylvania reached its all-time peak during the war year of 1918, when 177 million tons were produced. By 1929, production has dropped to 142 million tons, in 1932 to 74 million tons, the lowest figure since 1899.

Traffic Safety Institute Convenes

The third annual National Institute for Traffic Safety Training will be held at the University of Tennessee, Knoxville, August 12 to 24. The Institute was first sponsored in 1938 by eleven national organizations to provide specialized training in proven traffic accident prevention methods and techniques for traffic engineers, traffic police officers, license law examiners, statisticians, teachers and others engaged in traffic safety work.

Battery-Brooklyn Tunnel Started

As the new $35,000,000 Brooklyn-Queens Belt Parkway was opened with colorful ceremonies June 29, New York City's Mayor F. H. LaGuardia announced RFC approval of a $57,000,000 loan toward the Battery-Brooklyn Tunnel, vital link remaining to be forged in the chain of roads around the city.

Actual construction work on the new tunnel, estimated to involve a total cost of $80,000,000 and a five-year construction schedule, has already started.

The new tube, carrying into fulfillment a civic dream of long standing, will tap the West Side Highway and an extension of the East River Drive, skirt Governor's Island to the north and reach Brooklyn at Hamilton avenue. Notice of RFC loan approval, last major step awaited prior to start of construction, was received by Mayor LaGuardia June 28 in a telegram from Federal Loan Administrator Jesse H. Jones.

Opening of the Belt Parkway culminated 18 months of construction, during which 11,800,000 cubic yards of hydraulic fill were pumped, 4,800,000 cubic yards of dry fill were moved, 530,000 cubic yards of concrete, 1,500,000 square yards of masonry, 400,000 lineal feet of piles, 320,000 tons of steel were used and some 9,000 men were employed.

Demonstrates "Reinforced Ice"

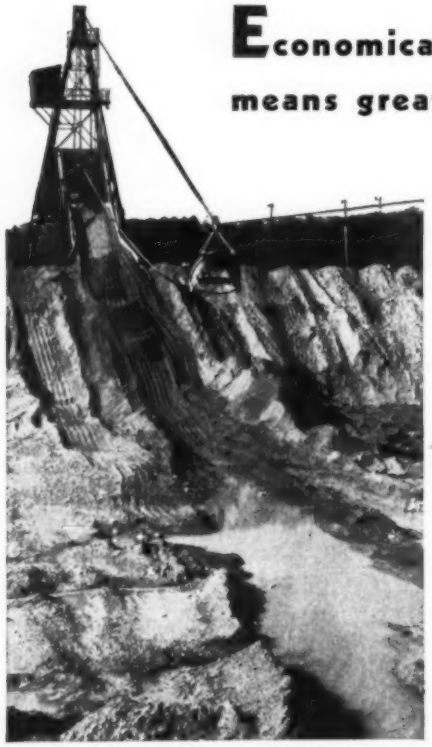
By Bethune Jones

A demonstration designed to show that "reinforced ice" can be used inexpensively and to other advantage in temporary construction work was conducted June 28 in New Haven, Connecticut, by its developer, Dr. Karl P. Billner, New York industrial scientist and inventor, before a group of Yale University and New Haven engineers and architects.

Produced principally by forcing a refrigerant through an assembly of pipes and spraying them with prechilled water, the "reinforced ice" was claimed to be sufficiently strong for use as a temporary arch in building bridges, for coffer dams and other temporary construction purposes.

Dr. Billner demonstrated outside a New Haven ice company's plant that a 30-foot beam of "reinforced ice" 25 by 25 inches square had approximately the same weight resistance as concrete. Frozen in the ice firm's yard three weeks earlier, the ice beam had been kept frozen at a cost of 60 cents a day. When subjected to nine and a half tons pressure during the demonstration, it sagged only a quarter of an inch.

The beam used for the demonstration was made of 16 one-inch pipes in tiers of four each through which a refriger-



Economical material-handling means greater profits . . . .

You are probably missing an opportunity for *real* savings (which means greater profits) if you aren't applying SAUERMAN ECONOMY to your long range material handling work.

Just in case you haven't considered the use of a SAUERMAN Machine, we'd like to call your attention to the fact that SAUERMAN Power Drag Scrapers and Cableway Excavators (and only SAUERMAN) will dig, haul, and dump 10 to 1000 cubic yards per hour over ranges from 100 to 1500 ft.; require the services of only one operator; are pleasingly low on maintenance; and are extremely flexible—handling sand, gravel, clay, loose ore, blasted stone and other materials with equal facility.

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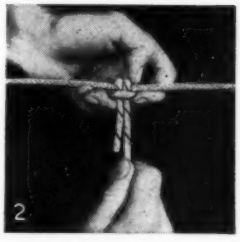
LOAD THE BORE HOLE *right*

Loading is safer, quicker, simpler when you use Primacord, for no blasting cap is required in the bore hole.

Lower a properly laced cartridge slowly and smoothly to the bottom of the hole. As soon as it reaches the bottom, cut the Primacord from the spool, allowing proper length for joining to the main line. Draw the fuse taut and secure with a stone for the rest of the loading and tamping.

Deckloads are extremely simple. The Primacord loads from top to bottom of the bore hole through all deckloads.

The Primacord Booklet gives full information on the use of this modern, instantaneous blasting fuse. Send for your free copy today.



PRIMACORD·BICKFORD

Detonating FUSE

THE ENSIGN-BICKFORD CO., Simsbury, Conn.

Makers of Cordeau-Bickford Detonating Fuse — and Safety Fuse since 1836

PB23

1. Tie through cartridge.
2. Half hitch branch to main line.
3. Connect main line lengths with square knot.
4. Fuse and cap on end of main line.

IMPORTANT: Branch lines should lead away from main lines at *right angles*. Avoid kinks and small loops.

For your convenience in writing to The Ensign-Bickford Company, you will find a card bound in this issue.

ant was forced. The pipes were then sprayed with pre-chilled water held in a rubber mold. During the three weeks the ice beam remained in the ice company's yard it was covered with three-quarter inch plyboard.

One of Dr. Billner's suggested applications for the ice was in the erection of temporary ice arches between the piers for a bridge to serve as support for permanent concrete arches during the course of their construction. This, he contended, would in many instances be cheaper and speedier than the present methods of driving piles and erecting temporary supports from the bottom of a stream.

Although declaring the new technique "may be very, very important and bids fair to have structural and commercial value," Dr. Billner said it was new and that he was still "feeling his way" without "much detail." He likened it to the old theory of driving pipes in mud and freezing it.

Confident that reinforced ice can be used for some of the purposes to which concrete is now put, Dr. Billner pointed out the ice would be a lot less expensive since it requires only one of concrete's three ingredients — water. The detrimental low melting point characteristic of ice, he said, can be overcome by artificial freezing, and other weaknesses can be met by proper reinforcement and by understanding the relation of strength to degree of cold.

Explaining how his development could be employed in the construction of coffer dams, Dr. Billner said:

"Sink down a light sheeting with weights attached to the bottom of the sheets and form in this manner the outlines of the dam. Set down pre-made assemblies of piping between the inner and outer sheeting and freeze the water in the enclosure. The refrigeration pipes serve as reinforcement."

OBITUARY

Raymond F. Walter

Raymond F. Walter, engineer in the service of the Bureau of Reclamation for 37 years and its chief engineer for the last 15 years, died June 30 of a heart attack in Fresno, California. He was 66 years old.

Mr. Walter had not been feeling well for some time, and late this spring illness compelled brief absences from his office at his Denver, Colorado, headquarters. A short time ago he went to California on leave in the hope of obtaining, through complete rest, some relief. Feeling better he visited the construction work in progress at Friant Dam, and became suddenly ill there. Taken to a hospital in Fresno, he died during the night.

John C. Page, commissioner, Bureau of Reclamation, in notifying Secretary of the Interior Harold L. Ickes of the death of the man who had supervised the construction of such famous projects as Boulder Dam, Grand Coulee Dam and Shasta Dam said:

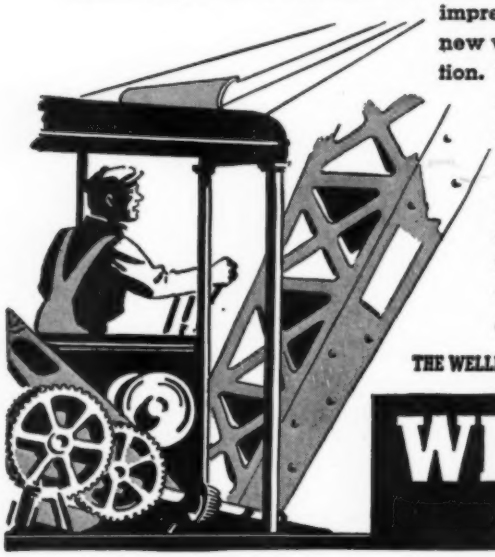
"With deep regret I must tell you that the Bureau of Reclamation has lost its most valued employee, Chief Engineer Raymond F. Walter. His death leaves a gap which can never quite be filled. Mr. Walter was the country's recognized authority on heavy construction. The Bureau will miss him sorely. He was respected and loved by all of us who had worked with and for him these many years.

"The death of Chief Engineer Walter after a lifetime of service to the Bureau of Reclamation and the Department of the Interior is a severe blow. For 15 years Mr. Walter had been in active charge of what is generally recognized as the greatest engineering office in the world—the Denver engineering headquarters of the Bureau of Reclamation. His services were outstanding. His unfailing loyalty to his organization, to his Bureau and his Department, and to the United States Government, has provided an example for the thousands of younger men working under him. His unexpected death is a shock to the whole Department."

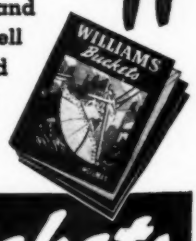
Mr. Walter is survived by his widow, Mrs. Lillian Leone Phillips Walter, a daughter, and a son.

"FAR AHEAD OF BUCKETS WE HAVE USED IN THE PAST"

● M. F. Quill & Son, Cincinnati, Ohio, are using a Williams ¾ Yard Multiple Rope Bucket for excavating and material handling. They write: "We are extremely well satisfied with the performance of this bucket and much impressed with your new welded construction. We feel the design, construction and materials are far ahead of any of the competitive buckets we have used in the past."



You, too, will find Williams digging speed and durability a big factor in producing profits. Tell us the type of service you are interested in and we will send free, individual bulletins giving complete information.



THE WELLMAN ENGINEERING CO., 7002 Central Ave., Cleveland, Ohio

WILLIAMS *Buckets*
built by WELLMAN

For your convenience in writing to The Wellman Engineering Co., you will find a card bound in this issue.

build airports for DEFENSE

You get smooth, accurate, finished work with a Bucyrus-Erie scraper. And that's what you need for building airports. Here's a scraper that cuts accurately, spreads evenly, and finishes smoothly. Two-line operation gives you positive independent control of frame and cutting edge at all times so that you can hold an accurate grade both in cutting and in spreading. There's practically no side-spillage at any time because the side plates of the frame extend ahead of the cutting edge.

This scraper beats them all for finishing. With bowl held in raised position the scraper can be used as a substitute for a grader. Operator has full visibility of blade so that he can see what he's doing and hold the blade where he wants it.

You'll like the smooth finished work this scraper does. You'll make money on the fast cycles it gives. See your International TracTracTor Distributor and get the complete story on this new 4-wheel scraper.

You get positive independent control of the frame and cutting edge so that you can hold a smooth accurate grade. Side plates can be used as a guage for measuring depth of cut.

You can spread in thin layers or in thick ones, with the cutting edge striking off the dirt smoothly and evenly to whatever depth of spread you want.

With bowl held in raised position, you can grade off dirt from the high spots and fill smoothly in the low places in the same way that a grader does.

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN

Relocating Route 41

(Continued from page 455)

deposited their loads at the most advanced point of the fill while the 3-yard trucks dumped to the sides. The LeTourneau 'dozer mounted on a Caterpillar RD-7 kept the fill level along with the aid of a 12-yard LeTourneau scraper, drawn by a Caterpillar RD-8, which was put to work leveling the high spots.

The job of keeping the finished grade level, as well as keeping the hauling roads in shape, was handled by an Adams leaning wheel grader towed by a Caterpillar "60."

Night operations were carried on under the light of a bright Michigan full moon and electric spotlights mounted on most of the equipment. Ordinary dishpans, with a bulb mounted in their center made excellent floodlights at the fill. A Kohler light plant provided the necessary current for these unique lights.

On-the-job lubrication service was provided by a Ford V-8 truck equipped to furnish grease, oil, gas and diesel fuel to the machines. Air for rubber-tired equipment was also available from an air compressor mounted on the service truck.

A maximum of 130 men were employed on the contract. With the exception of company key men all help was hired locally.

P. M. Thornton is the president of the Thornton Construction Company which has its offices in Hancock, Michigan. A. L. Mathy is the vice president and W. T. Lawler is secretary of the company. Mr. Mathy actively supervised the operations on the Baraga contract with E. W. Whitman taking care of the time-keeper's duties. Other company men on the job were: Harry Swanson, Earl Trevarrow, grade foremen; C. J. Mathy, crib fill foreman; Arthur Prudhome, blasting foreman; Joseph Stetter, culvert foreman; and John Ohtonen, clearing foreman. Herman Lescelius was the master mechanic on the job, while Gregory Preiner is the chief mechanic at the Thornton maintenance shop in Hancock.

J. E. Wilbur, district engineer, Michigan State Highway Department, is supervising this State-Federal Road Project. Joseph W. Caspary is the project engineer in charge of the work.

Although the road is soon to be paved, at the time of this writing the paving contract was still to be awarded.

● Ten yards of dirt are bound for the fill as this Koehring Trail-Dump rolls out of the borrow pit.

● Equipped with a drop hammer, a Bucyrus-Erie 22-B puts in three pile-jetties to break up wave action against the crib.

Digging "A La Mode"

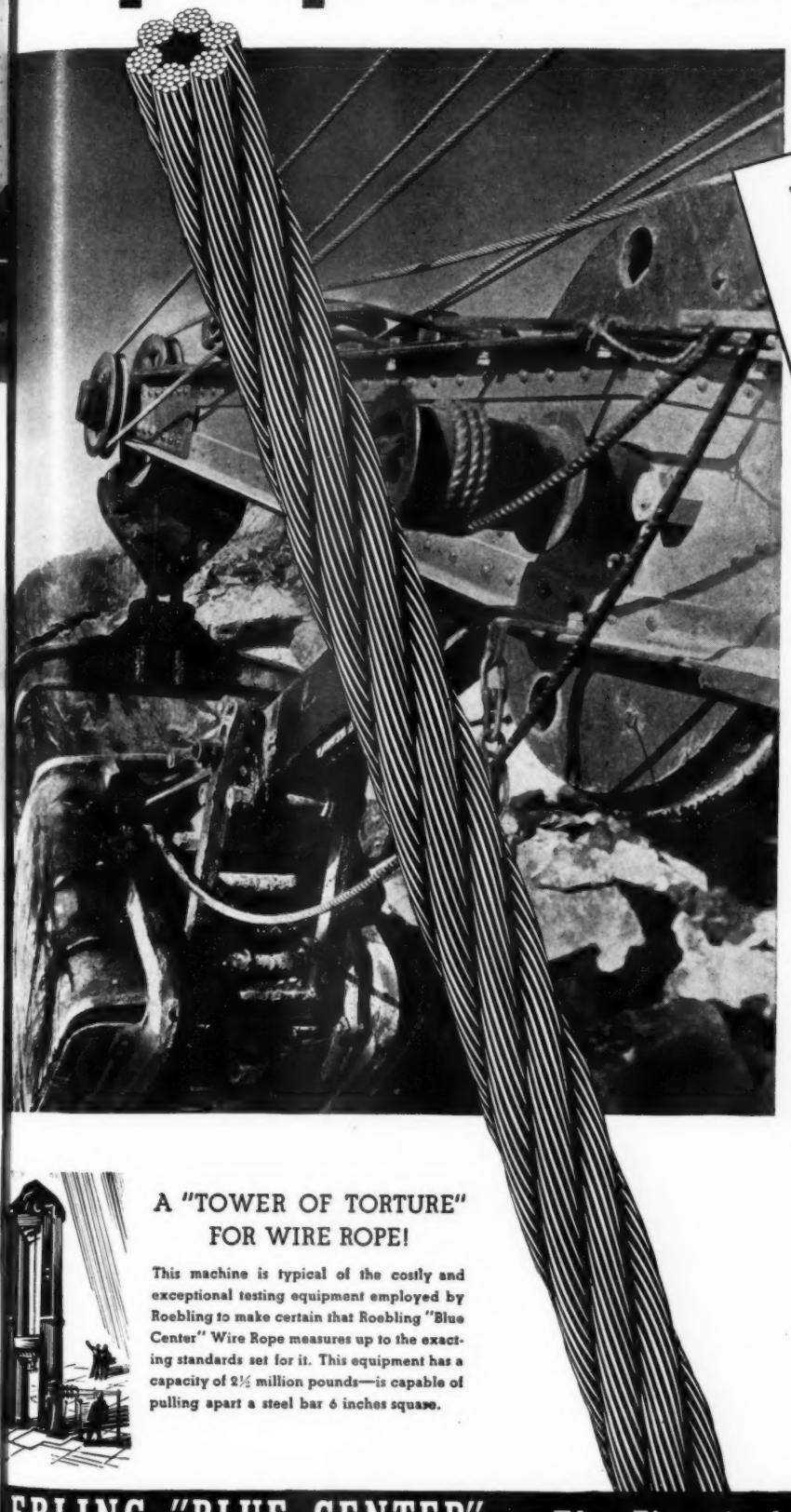
(Continued from page 457)

in a ditch the width of the bucket, and 11 feet deep. In straight excavation where the going is good, he gets 500 cubic yards of pay material in 8 hours. Excavations run in many types. Basements and foundations are dug for buildings. Slides are removed from roads. Mr. Howard has done work for some 40 contractors around San Diego.

The matter of accessibility to highways is never a problem here, as it is on most construction jobs. San Diego County has an excellent system of paved highways leading to almost every conceivable place where construction might be planned. Mr. Howard's gravel plant and main yard is only 700 feet from a concrete highway. He maintains this job road to the plant himself.

This gravel plant is the other half of Contractor Howard's $40,000 yearly business. It is small, capable of producing 200 tons of finished aggregate in an eight hour run, and equipped to hoist, screen, wash and grade aggregate

trip Rope Costs to the Bone...



ROEBLING

"BLUE CENTER"

WIRE ROPE

STANDARD OR PREFORMED

Every dollar saved counts on most earth moving and construction jobs. That is why an ever-increasing number of contractors are taking advantage of the cost-cutting ability of Roebling "Blue Center" Wire Rope.

First of all, "Blue Center" is the finest of all Roebling Wire Ropes. It represents the highest achievement of all Roebling's research and manufacturing efforts. It has been developed with the one idea of producing a super-quality rope—one which will assure the maximum of durability, safety and economy in rope service. Made of famous Roebling acid open-hearth steel—it provides the highest degree of resistance against abrasion, fatigue and sudden shocks.

You can easily prove the cost-cutting and safety advantages of Roebling "Blue Center" Wire Rope. Install "Blue Center" when you re-rope your equipment. Keep accurate service records. Compare. Then, you be the judge.

A "TOWER OF TORTURE" FOR WIRE ROPE!

This machine is typical of the costly and exceptional testing equipment employed by Roebling to make certain that Roebling "Blue Center" Wire Rope measures up to the exacting standards set for it. This equipment has a capacity of 2½ million pounds—is capable of pulling apart a steel bar 6 inches square.

JOHN A. ROEBLING'S SONS CO.

Trenton, N. J. Branches in Principal Cities

EBLING "BLUE CENTER"... The Finest of all Roebling Wire Ropes

from the rough material dug from the creek.

No stripping is necessary, except for an 18-inch layer of overburden lying over the rough aggregate in the creek bed. This rough material is composed of bank-run gravels and older alluviums, and lies in about a 6-foot layer under the overburden. It is fairly well coated with silt and fines, making it necessary to wash the aggregate before it can be used in building construction.

A model 105 Northwest dragline is used to cast the 18-inch overburden aside and to load the original material into the job trucks. To haul rough material from the excavation site to the gravel plant, two 5-yard White dump trucks, one 5-yard International, and one 5-yard Autocar are used. All of these trucks are equipped with Woods hoists. Since the capacity of the plant is small, only one or two of the trucks are used at a time to haul material to the gravel plant.

This operation, by the way, brings to light one of the more interesting practices common to a small contractor who must operate efficiently and economically, which illustrates the means sometimes taken to accomplish the end. Mr. Howard employs men who are versatile. He has to. For instance, the Northwest dragline is left in the creek wash with the motor running, without an operator. A truck drives up, backs into loading position under the boom, and the truck driver jumps out of the truck, crawls into the dragline cab, and loads out his own truck. Then he dogs the haul line with a full bucket pulled up close, gets in his truck and is off with another load. It would be inadvisable, of course, for a small contractor to use a dragline operator to load only one or two trucks busy on a 2,000-foot haul.

● Irving P. Howard (right) supervises the "unpacking" of a new Bucyrus-Erie 10-B at his yard headquarters.

Plant trucks which are not being used around the gravel pit or undergoing repairs can generally be found around the Bucyrus-Erie machines hauling material.

General Electric and United States electric motors are used to operate the chain bucket hoist and screening parts of the batch plant. Water is pumped up to the gravel washer with a 2-inch Deming pump.

Marketing the Aggregate

The finished aggregate must be good material. It must be uniform in the size ranges and is required to pass the sodium sulphate test,

MATERIALS
METHODS
FACILITIES
EXPERIENCE
ORGANIZATION

Five Vital Points—

That Bring Long Life To

"Hercules" (Red Strand) Wire Rope

Consistent top-flight performance is never a matter of chance, and the year by year record of dependable field service that "HERCULES" (Red-Strand) Wire Rope has established is due to our strict adherance to **all** details of manufacture. These details start with the selection of proper materials, and they follow through until the last test and inspection has been made and approved by experienced workmen.

Because nothing is left to chance in the manufacture of "HERCULES" (Red-Strand) Wire Rope, you can depend on it for longer life . . . lower operating costs . . . more satisfaction. Why not give it a trial?

In order to be suitable for all purposes, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand construction — all of which are available in either the Standard or Preformed type.

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WIRE ROPE MAKERS — ESTABLISHED 1857
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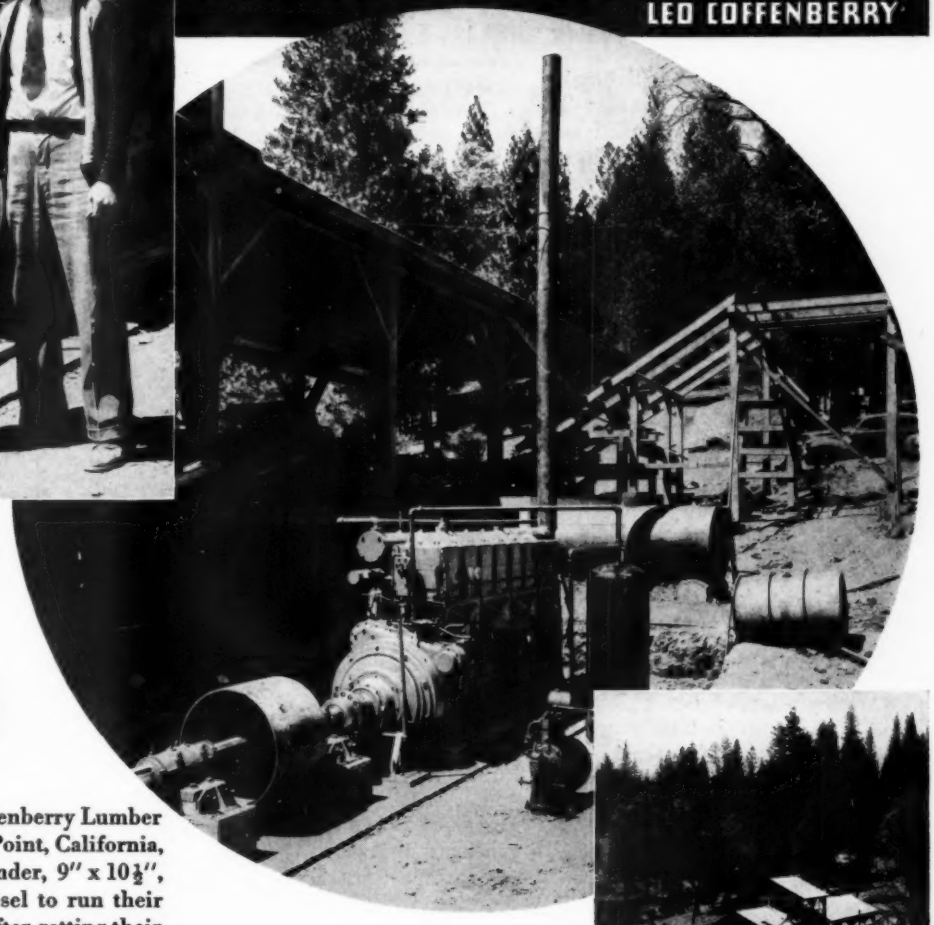
For your convenience in writing to A. Leschen & Sons Co., you will find a card bound in this issue.

PERFORMANCE *Beyond* ANY EXPECTANCY — REPORTS LEO COFFENBERRY

Louis Robin and Leo Coffenberry
Principals of the
Coffenberry Lumber Company
West Point, California



This Spring the Coffenberry Lumber Company of West Point, California, installed an 8 cylinder, 9" x 10½", 275 H.P. Atlas Diesel to run their new saw mill, and after getting their operation well under way, they make the following report on the performance of their new Atlas Diesel:

"Our engine runs beautifully... but we will never have an opportunity to know how much power it really has, as on our initial trial in tough fir logs, it played along as if it had no load at all.

"We expected efficiency when we ordered an Atlas engine, but the way this handles the job is beyond any expectancy. Before coming here we operated a mill in Oregon where we had an Atlas as well as another make for three years and we chose an Atlas as being superior for our new mill."

ATLAS IMPERIAL DIESEL ENGINE CO.

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CENTRAL DIVISION . . . . 228 NO. LA SALLE STREET, CHICAGO, ILL.
SOUTHWESTERN DIVISION: 5726 NAVIGATION BLVD., HOUSTON, TEX.
WESTERN DIVISION . . . . 1000 NINETEENTH AVE., OAKLAND, CALIF.

ATLAS *Imperial* DIESEL ENGINES

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and a decantation test for foreign adherent material. Some of the aggregate is sold to building contractors around San Diego and much of it is sold to the state of California for use in the San Diego State College. Practically all of the finished aggregate is used in building work.

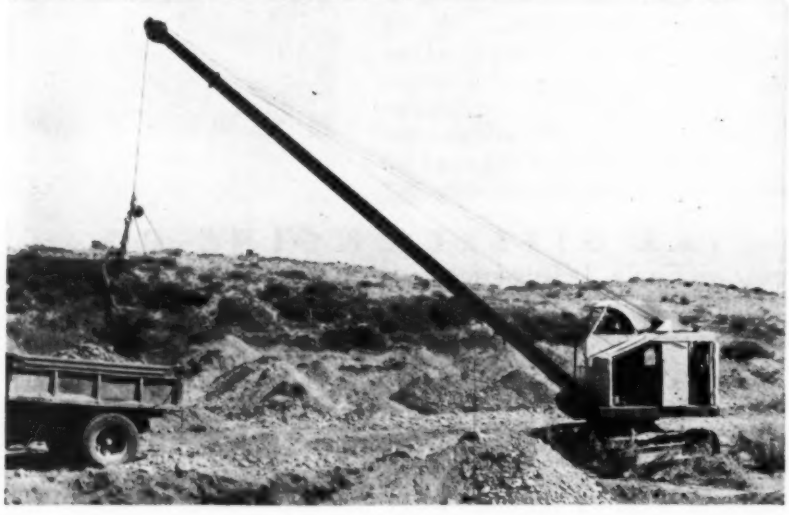
All repairs, welding and blacksmithing is done by Charles T. Willis, 1310 K Street, San Diego. His shop is easily accessible to the work, and here again it would be too expensive to set up a shop stocked with tools and repair supplies, for economy is a guiding factor.

A service shop is maintained. however, for fueling and greasing the trucks, shovels and draglines. High pressure grease guns and Alemite zerck type fittings are used. The shovel and dragline are serviced in this central yard, usually between the short jobs they do.

A crew of six men is steadily employed. Only in exceptional cases where construction demands more help are more men put to work. This small crew, however, is entirely adequate to do the amount of work generally required, and they handle it nicely in 8 hours. C. E. Sylvester is general foreman and timekeeper, with Mr. Howard himself supervising most of the work.

In the future perhaps . . . may-be five years, or ten . . . you may read Mr. Howard's name in connection with a gigantic construction job. But right now he's proud to say that his little gravel plant and his excavation jobs, however small the scale, are right on the line for workmanship.

● Newest addition to the Howard equipment lineup is this Bucyrus-Erie ⅜-yard dragline.



Drilling Blast Holes . . .

(Continued from page 461)

Master Pavement Form Setter	.85
Oiler	1.25

Skilled Labor—minimum—$.75 per hr.

	Per hr.
Blaster	$1.25
Blacksmith	1.62½
Power Shovel Operator	2.12½
Master Finisher on Concrete Pavement Only	1.25
Powderman	.75
Well Drill Operator	1.00
Well Drill Operator's Helper	.75
Driller (Pneumatic)	1.00

The Men Behind the Job

Arthur Brandt is the Superintendent of the Department of Public Works, State of New York, and J. S. Bixby is the District Engineer. W. C. Murray was the Engineer in charge of the job.

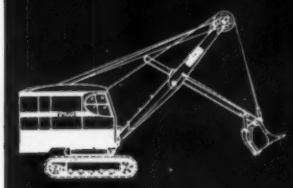
Camarco Contractors, Inc., was founded by Michael Camarco in 1901 and is responsible for the construction of many well known stretches of highway in New England and eastern New York State, such as the famous Jacobs Ladder near Lee, Massachusetts, the Mohawk Trail from North Adams to Charlemont, Massachusetts, and much of the Berkshire Trail from Dalton, Massachusetts, to Cummington, Massachusetts. The company has also operated fifteen quarries at one time or another, although it is now operating only one quarry, the Putnam County Crushed Stone Company.

● Supports of the Woods Bridge frame this view of the water well drill working on a rock cut in the background.

Michael Camarco retired recently and Joseph M. Camarco is now President; Thomas Camarco, General Superintendent; and David Camarco, General Mechanical Supervisor. Thomas Camarco was in charge of the work covered in this article, paying special attention to well drilling, blasting and shovel operations. Irving Sutliff assisted him as blasting foreman. None of the job was sublet.

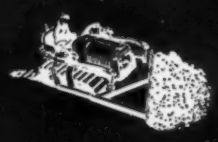
Camarco Contractors, Inc., are thoroughly convinced of the practicability and profit possibilities of making blast holes with the 21-W Bucyrus-Erie well drill, both at their quarry and on highway construction jobs where there are deep rock cuts, although not particularly eager to divulge the secrets of their technique to rival contractors, for which one can hardly blame them.

Where to Buy BUCYRUS ERIE and BUCYRUS MONIGHAN Products



For Shovels, Draglines, Cranes, Clamshells, Skimmers, and Dragshovels 'Phone or Write the Nearest Dealer or Branch Office Listed Below.

For Large Shovels and Draglines, Walking Draglines, Bucyrus-Ruth Excavators, Blast-Hole, Prospecting, Oil Well, and Water Well Drills, 'Phone or Write the Nearest Bucyrus-Erie Branch Office Indicated Below with an *.



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ARIZONA, PHOENIX: Crawford Tractor Co., 315 E. Jefferson St.
ARKANSAS, LITTLE ROCK: Lyons Machinery Company.
CALIFORNIA, LOS ANGELES: Crook Company, 2900 Santa Fe Avenue, Phone Kimball 5137.
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COLORADO, DENVER: Ray Corson Machinery Co., 1646 Wazee Street.
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IDAHO, BOISE: The Intermountain Equipment Co., Broadway at Myrtle St. Phone 171.
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MISSISSIPPI, JACKSON: Mississippi Road Supply Co., Telephones: Long Distance 9906, Local 3676.
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OKLAHOMA CITY: Clarence L. Boyd Co., Inc., 17 S.W. Pottawatomie St.
OREGON, PORTLAND: Clyde Equipment Co., 17th & Thurman Streets. Phone Broadway 5561.
*PENNSYLVANIA, PHILADELPHIA: Bucyrus-Erie Company, 821 Commercial Trust Bldg. Phone Rittenhouse 4231.
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PECOS: Tri-State Equipment Co.
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WASHINGTON, SEATTLE: Clyde Equipment Co., 3410 First Ave., South.
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Canada

BRITISH COLUMBIA, VANCOUVER: Finning Tractor and Equip. Co.
MANITOBA, WINNIPEG: Kipp-Kelly, Ltd., 68 Higgins Ave.
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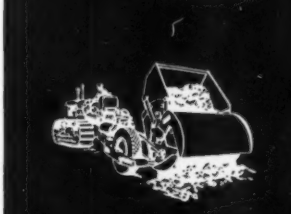
QUEBEC, MONTREAL: F. H. Hopkins & Co., Ltd., 340 Canada Cement Bldg., Phillips Square. Phone Plateau 1136.



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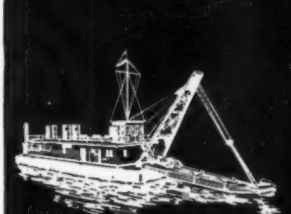
International Industrial Power Dealer



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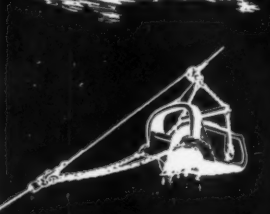

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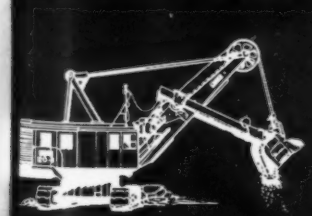

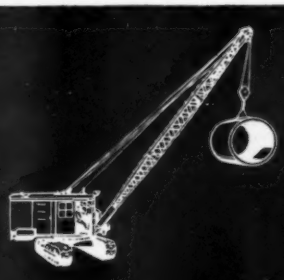

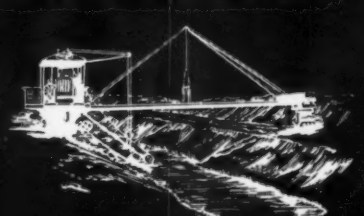

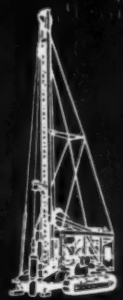

Trade notes

NFA and NASO safety goggles can now be obtained direct from their manufacturer, the American Optical Company, Southbridge, Massachusetts. Previously these goggles were manufactured exclusively for the National Founders Association to be sold to members and customers as part of the association's service. However, the association has discontinued this practice, and notified its members that orders should be placed direct with the optical concern.

Announcement comes from Manila that Mechanical Supplies, Incorporated, have purchased the business and stock of the Barry Engineering Company. The new corporation, headed by D. B. MacAfee as president and general manager, intends to materially increase its lines.

Elastic Stop Nut Corporation announces the moving of its general offices from Elizabeth, New Jersey, to its new plant at 2332 Vauxhall Road, Union, New Jersey. The new plant will be used exclusively for the manufacture of Elastic stop self-locking nuts. A feature of interest is the fact that all of the steel construction is fastened with bolts and Elastic stop nuts, instead of rivets.

It is announced also that this corporation's Houston, Texas, office has been moved to The Merchants and Manufacturers Building.

S K F Industries, Incorporated, Philadelphia, Pennsylvania, materially increases her capacity with the addition of a new plant building. The work here will be devoted exclusively to the manufacture of antifriction bearings.

The Marmon-Herrington Company, Inc., Indianapolis, Indiana, manufacturers of all-wheel-drive motor vehicles, track-laying tractors and combat tanks, is doubling the size of its factory.

The company's new building program, includes an extension to the main assembly plant to double its present capacity; and the erection of an additional new building; the construction of a spur track into the plant, from the Belt railroad to provide 300 feet of loading docks, and the complete modernization of the boilerhouse.

Construction Products Company, 13th and Grace Street, Omaha, Nebraska, has just been appointed by The Rawlplug Company, Inc., 98 Lafayette St., New York, N. Y., as their distributor in the Nebraska territory.

They will carry a complete line of anchorage devices as made by this company, as well as their drills and accessories, and will operate as the Rawlplug Omaha Company.

Expansion of their facilities at the Detroit diesel engine division of General Motors Corporation was recently announced by W. T. Crowe, general manager. A 600 ft. by 280 ft. addition will be built upon the south side of the present plant and a new office building will be built east of this enlarged structure.

Book reviews

McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York City, N. Y., has placed on the market a structural engineer library—six books covering every phase of design and practical construction. Authoritative and complete information found in these publications deals with foundations, structural members and connections, stresses in framed structures, steel and timber structures, bridges, and reinforced concrete and masonry structures. McGraw-Hill offers these books for a free ten day examination, no money down and as long as 6 months to pay. The price for the entire library is $27.50.

A new twelve page booklet dealing entirely with rock drill accessories has just been issued by Ingersoll-Rand. Stressing the proverb, "A chain is no stronger than its weakest link," this booklet illustrates and furnishes data on the many accessories necessary to efficient rock drilling. These include such items as: hose and couplings, air filters, grinders, steel cutters, air-line lubricators and rock drill mountings; moil points, chisels and spades for breaking concrete—cutting asphalt—tamping and digging.

Gar Wood Industries, Inc., of Detroit, Michigan, announce the release of a new group of bulletins. Bulletin No. 12 illustrates and describes Gar Wood garbage and rubbish units, No. 15 contains information about their single, vertical and dual telescopic hoists and bulletin No. 26 gives details and illustration of the patented Gar Wood Trussed Under-Structure for dump bodies.

Upon request, Gar Wood Industries will send one or all of these bulletins.

Copies of this booklet, Form 2410, may be obtained from Ingersoll-Rand Company, 11 Broadway, New York City, or any of their branch offices.

A new bulletin dealing with the latest engineering refinements in their type 8 CP and type 9 CP diesel engine, has just been issued and is now ready for distribution, by the Chicago Pneumatic Tool Company, 6 East 44th Street, New York, New York.

For your copy, address your request to the above office or any of their branch offices.

A new catalog section on its line of Plastikon rubber putty, adaptable to many uses in building and industry has just been published by The B. F. Goodrich Company, Akron, Ohio. Copies will be sent upon request to the manufacturer.

Current interest of the transportation world in the diesel engine is given educational aid and added impetus by an illustrated booklet, "Dodge and Diesel." Free copies of the booklet will be mailed to any one writing for it to the Truck Sales Department of the Dodge Division of Chrysler Corporation, Detroit. The text presented in "Dodge and Diesel" explains and drawings illustrate what the diesel engine is and how it operates as compared with the conventional gasoline engine.

HAYWARD BUCKETS

PLAY SAFE . . .
CHOOSE HAYWARDS

Hayward Buckets won't fall down on the job, cause time out, or require costly repairs.

THE HAYWARD COMPANY
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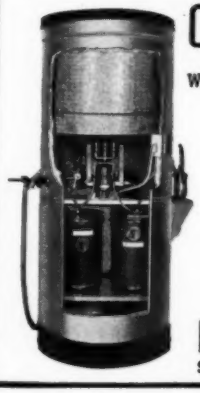

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1—Filters lubricating oil of any quality or grade from either gasoline or diesel engines.

2—Returns up to 90% of your used crankcase oil ready for re-use.

3—Saves from 60 to 80% on your oil cost.

Write today for complete story.

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POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o EXCAVATING ENGINEER . . . . . at South Milwaukee, Wisconsin

OPERATOR

Experienced on crane, dragline, clamshell, shovel and pile driver. Has had several years experience on construction jobs in South America. Familiar with coal strippers and loaders. Best of references. Box 9154

ALL-AROUND OPERATOR

All-around experience of 28 years on shovels, cranes, draglines and pull shovels. Can overhaul any make of machine—has own set of tools. Has been foreman over 5 shovels for eight years. Work covers almost all types of jobs throughout U. S. Best references. Box 9156

SUPT.-FOREMAN

Superintendent or foreman of gravel plant or rock crusher. 15 years' experience. Understands operating and repairing all makes of equipment. Best of references. Box 9153

EXPERIENCED OPERATOR

Operator with fifteen years' experience on gasoline and diesel powered shovels, draglines, and crane-clamshell machines on highway and sewer construction jobs desires steady work anywhere. Preference: Northwest shovel or dragline about 2 yard capacity. Can do own repair work. References furnished. Age 32. Married. Now located in Missouri. Box 9159

OPERATOR

Experienced operator familiar with railroad and highway grading, canal and quarry excavating. Has 7 years experience on shovel, 9 on dragline and clamshell, steam, gas and diesel models. Prefers position on dragline, any make, 6- or 7-yard size. Age 44, single, will go anywhere. Can do own repair work. References. Box 9149

HELP WANTED

Experienced erector required by a foreign concern—applicant must be capable of erecting and demonstrating both large stripping shovels and draglines, also heavy-duty quarry machines—all Ward-Leonard electric controlled. Also expected erector will properly instruct operators. Duration of work approximately six months on job. Successful past record essential. Send list of people to whom employer can write for reference your ability. State wages and terms expected, whether married or single and when available. Box 9155

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Many new and ingenious uses of oilless bearings, Metaline plates and discs are described and listed. Included are Metaline bearings in equipment that must avoid oil drippage; bearings located in inaccessible places; examples of heavy duty and under water service and operation at variable and excessive temperatures. Tables of sizes and specifications are included, as well as complete instructions for installation.

The catalog will be of particular interest to plant maintenance men and machinery designers. Copies will be sent on request to the company.

The Hayward Company of New York, New York, manufacturers of digging and material handling equipment, have recently published a new bulletin on their Catch-Basin bucket. The many illustrations which it contains, showing the bucket at work, should be of particular interest to engineers, superintendents, city officials and contractors. Sizes in which this bucket is obtainable, dimensions and other data are given in the form of a table for easy reference.

Copies of the bulletin can be obtained by writing direct to the manufacturer, The Hayward Company, 50 Church Street, New York, New York, and asking for Bulletin 805.

A detailed report on New Jersey's state-wide "safety lighting" program has just been released by the New Jersey State Highway Department. Dealing with the subjects of saving lives and the increased rate of night traffic fatalities being halted, this booklet will be of interest to everyone. Single copies are available for 25c, the price decreasing with larger scale purchases. Send your request for a copy and more details to the Street & Highway Lighting Safety Bureau, 155 East 44th Street, New York, N. Y.

The Blackhawk Manufacturing Co., Milwaukee, Wis., announces the release of a new combination catalog and "use" manual, illustrating many new products and applications which have never before appeared in print. The products include hydraulic hand jacks; gauge-equipped jacks; wheeled floor jacks; high-pressure valves; remotely controlled jacks, both hand-operated and motor-driven; hydraulic tools for maintenance and production; and hydraulic pipe and conduit benders.

A copy can be secured by writing Blackhawk Mfg. Co., Industrial Supply Division, Milwaukee, Wis., and specifying Book No. 40H.

A new data book on Electroline-Fiege connectors has just recently been released by the Electroline Company, 4005 South LaSalle Street, Chicago, Illinois. A free copy can be obtained by writing the above company specifying bulletin F-2.

Broderick & Bascom Rope Company, St. Louis, Missouri, have recently published a new edition of their Riggers' Handbook. Profusely illustrated, this 96 page book contains information on wire rope and safety slings, fittings, socketing, splicing, and engineering data and is available upon your request.

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